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PICK IT UP

. . . and DROP IT IN!

IT'S AS SIMPLE AS THAT TO INSTALL THE VALVE ASSEMBLY IN A BAKER BAKWIK MODEL "B" DRILL PIPE FLOAT

NO TOOLS OR SPECIAL WRENCHES ARE REQUIRED

The Baker Bakwik Model "B" Drill Pipe Float is made with a straight bore body and contains a simple Valve Assembly constructed entirely without threads, which is *dropped into place by hand* and held securely by the tool joint pin above it. When an unrestricted fluid passage is desired, the Valve assembly can be quickly and easily removed from the Float Body.

VALVE ASSEMBLY QUICKLY AND EASILY SERVICED

Replacement of the Valve Seal is ordinarily the only servicing required during the normal operation of the Baker Bakwik Drill Pipe Float Valve Assembly . . . and this operation can be quickly accomplished in the four easy steps illustrated. When it is necessary to replace the Side Seals, new ones can be installed with equal ease.

Step 1

Step 2

Step 3

Step 4

POSITIVE ACTING BACK-PRESSURE VALVE

At the slightest reversal of pressure, the Valve, with its recessed oil resistant Seal, instantly seats against the Valve Seat, creating a positive, leakproof seal. The two oil resistant Side Seals act against the Float Body to likewise form a positive seal.

The efficiency of the Baker Bakwik Drill Pipe Float has been proved in thousands of wells in oil fields throughout the world and is considered standard equipment where a positive back-pressure valve in the drilling string is desired.

THE BAKER BAKWIK DRILL PIPE FLOAT AFFORDS THESE IMPORTANT ADVANTAGES

1. It prevents plugging the bit.
2. It eliminates the annoyance of pulling wet strings.
3. It relieves weight on the derrick and rig equipment as well as on the lines and draw works.
4. It lengthens the life of wire lines and brake bands.
5. It minimizes — often prevents entirely — serious damage in the event the drilling string should part.
6. It prevents blow-outs through the drill pipe.

ALSO OF IMPORTANCE . . .

is the fact that the Baker Bakwik Drill Pipe Float can easily be placed at any position in the drilling string; that the unit is designed for long life; that the Valve Assembly can be quickly and easily serviced on the rig floor; and that replacement parts can be secured at practically any Supply Store or Baker Warehouse.

Showing Bakwik Drill Pipe Float (complete with Valve Assembly) positioned in drilling string.

STRONG, SAFE VALVE ASSEMBLY CONSTRUCTION

Bakwik Drill Pipe Float Valve Assemblies are constructed of a minimum number of essential parts, each designed to give long, satisfactory service. The Cage is made of tough, abrasion-resistant steel, and the unrestricted opening through it is approximately the same area as the fluid passage through the tool joints. The Valve is made of special alloy iron cast integral with the steel stem. Both Valve and Valve Seat are ground to a perfect fit. The Valve Cage is constructed of close grained grey iron, carefully machined for accuracy. The Valve Spring is designed to perform long, efficient service. The two Side Seals and one Valve Seal are made of oil resistant packing, and afford maximum wear under all operating conditions.

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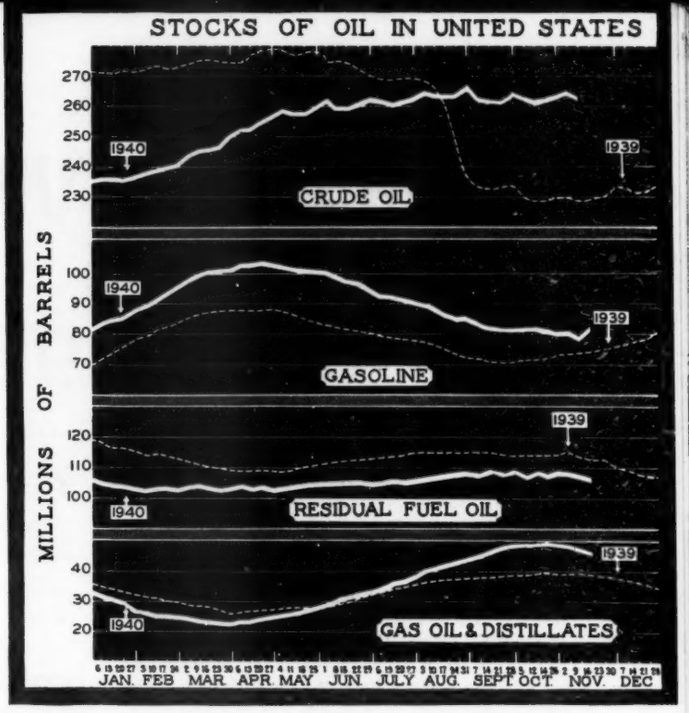
Trends

Hearings in Texas Emphasize Need of Uniform Practices



THE hearings of the Texas Railroad Commission held at Austin this week for the purpose of ironing out the difficulties that have developed in allocating markets and determining field allowables over the balance of the year have again emphasized the necessity of uniform rules in enforcing conservation regulations. The troubles in the Lone Star State are the result of practices several of which have been in effect for years. Some of these have to do with rules governing waste and others apply to the divisions of markets. Their enforcement has brought strong support from all classes of operators and royalty interests for a separate oil and gas commission which would take over the duties now administered by the Texas Railroad Commission.

In regard to proration a main bone of contention is whether or not the commission should continue its policy of the past in granting increased allowables in fields whenever it is shown that there is a market for the crude and also that it can be produced without waste. Proponents of this policy claim that the commission has no legal authority to refuse these requests for increased production. This practice has been tied in with granting of special allowables and exemptions from shutdowns which has resulted in wide fluctuations in Texas production, with the total allowable established at the start of the month a poor indicator of what the 30-day trend in the state's production will be.

Market students are giving special consideration to this situation because they believe a solution to the problem is necessary before Texas operations can be placed on a stable basis and the industry generally can schedule its 1941 operations. Conditions are comparable in some of the other oil states. Looking toward a uniform plan these matters will receive consideration at a meeting of the Interstate Oil Compact Commission to be held next month.

CRUDE PRODUCTION *3,571,865 bbl. daily average—down 25,555 bbl. One year ago 3,596,575 bbl.*

CRUDE STOCKS *261,631,000 bbl. as of November 9—down 2,189,000 bbl. One year ago 230,037,000 bbl.*

GASOLINE STOCKS *80,063,000 bbl. as of November 16—up 216,000 bbl. One year ago 75,170,000.*

RESIDUAL FUEL-OIL STOCKS *107,151,000 bbl. as of November 16—down 536,000 bbl. One year ago 112,054,000 bbl.*

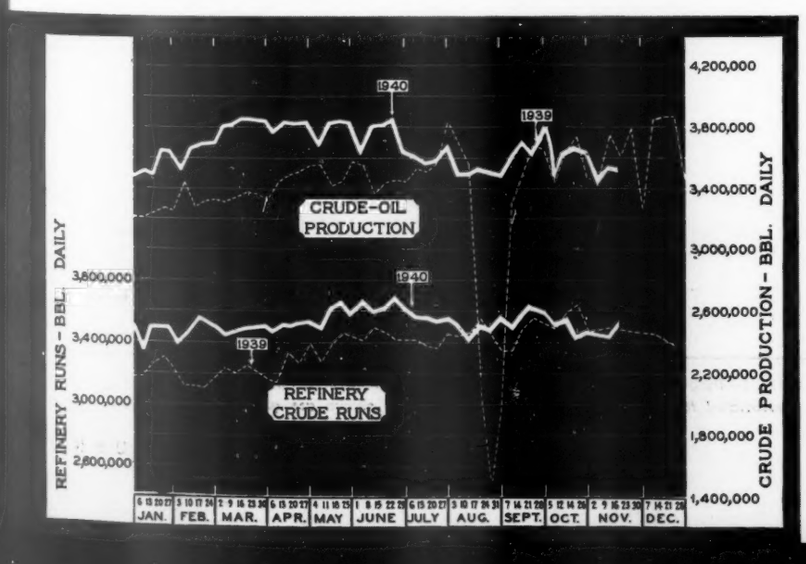
GAS OIL AND DISTILLATES *48,108,000 bbl. as of November 16—down 300,000 bbl. One year ago 38,917,000 bbl.*

REFINERY RUNS *3,540,000 bbl. daily week ended November 16—up 30,000 bbl. One year ago 3,515,000 bbl.*

DAILY AVERAGE PRODUCTION FOR WEEK

	Nov. 16, 1940	Bur. Mines Nov. est. of demand	Nov. state allowables	Nov. 9, 1940
Arkansas	69,285	71,000	69,508	69,375
California	622,550	583,000	571,000	616,250
Eastern states	105,100	100,600	.....	105,200
Illinois	340,840	385,000	.....	344,430
Kansas	192,200	186,000	190,000	168,950
Louisiana	282,415	274,000	279,973	279,990
North Louisiana	*66,725*	.....	.....	*67,040*
Louisiana Gulf Coast	*215,690*	.....	.....	*212,950*
Michigan	47,360	51,000	.....	47,500
Mississippi	16,140	13,800	.....	16,670
Nebraska	3,100	.....	.....	3,000
New Mexico	103,130	104,000	104,000	103,770
Oklahoma	396,475	413,000	390,000	392,825
Rocky Mountain states	95,130	97,600	.....	99,060
Texas	1,298,140	1,291,000	1,311,721	1,350,400
East Texas	*374,750*	.....	.....	*374,850*
West Texas	*215,100*	.....	.....	*228,850*
North Central Texas	*141,300*	.....	.....	*137,500*
East Central Texas	*74,900*	.....	.....	*77,950*
Texas Panhandle	*62,000*	.....	.....	*74,200*
Texas Gulf Coast	*340,340*	.....	.....	*357,500*
Southwest Texas	*89,750*	.....	.....	*99,550*
Total United States	3,571,865	3,570,000	.....	3,597,420

The recent sharp advances in tanker rates on coastwise shipments have not been helpful to Texas crude-oil and refinery markets. The same situation applies to the Louisiana Gulf Coast area. The drop in tanker rates during the summer months widened the markets for coastal products and the recent advances have reversed this trend. The position of some of the smaller Gulf Coast refiners is particularly critical. The tanker rates have reduced gasoline shipments, and inventories at several plants, in contrast to the national trend, have increased. Strength in residual fuel oils is reported in several refining centers. The assurance of industrial activity has resulted in many sales for delivery through the winter months. There were no important changes in prices for refinery products over the past week.


REFINERY RUNS – BBL. DAILY
CRUDE PRODUCTION – BBL. DAILY
CRUDE-OIL PRODUCTION
REFINERY CRUDE RUNS
1940
1939
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

Rumanian Wells in Overthrust Area Damaged by Earthquakes

By W. V. HOWARD

THE meager reports emanating from Bucharest as to the effect of the earthquake upon the Rumanian oil fields indicate that refineries and surface structures suffered relatively little damage, while the wells were seriously affected. This is contrary to general experience. Normally, bedrock suffers relatively little movement during an earthquake, while the surface of the earth and buildings which rest upon it may be badly shaken. The risk of damage from earthquake shock in the United States is very small, even in regions of active earth movements, but there is some risk.

It is generally known that earthquakes occur when rocks under strain suddenly relieve that strain by movement along a plane of weakness or a fault. The actual movement of bedrock may be a few inches, or in rare instances a few feet, but this sudden jerking movement sets up vibrations in the rocks which are transmitted outward and upward. The amplitude of the vibrations in the bedrock is very small but when transmitted through unconsolidated rock it may become very large. The same effect may be obtained by tapping a glass filled with jelly with a lead pencil. If the proper rhythm is followed, the light pencil taps will set up waves of noticeable amplitude in the jelly and may rupture the surface.

It is customary to laugh at the claims of San Franciscans that what they had in 1906 was not a serious earthquake but a fire. The fact is, however, that these claims are largely justified. It is estimated that less than 3 per cent of the property damage suffered by that city was caused by earth movements. The Spreckels Building, for example, was destroyed by the fire, but was not disturbed sufficiently by the earthquake to prevent the free movement of the elevators. Where buildings are damaged, it is generally found that they do not act as a unit and, therefore, different or opposing sets of vibrations are set up within them which may cause collapse. A church with a spire is vulnerable for this reason. Walls of brick or stone when not securely anchored to the rest of the structure may be pushed outwards by the floors and girders.

Effect on Oil Equipment

An oil refinery consists of a number of separated buildings, towers, tanks, and other structures connected by pipes. Each unit is securely tied together, but no two adjoining units may vibrate in unison. Consequently, there is a severe strain upon the connecting pipe which may cause rupture and consequent fire. The damage done by the quake itself is thus limited to a few broken pipes. Derricks which are constructed to withstand gales and are strong enough to handle 10,000 ft. of casing will not be affected by earthquake shock unless they are jarred loose from their base as a unit. Pipe lines crossing the fault may be broken or they may be ruptured where they pass from a rock surface to clay or loose earth. However, unless fire breaks out, these breaks are of little consequence and will result in little more than a few days' shutdown for repairs.

In this respect, the Rumanian earthquake appears to have acted along normal, conventional lines and if this is all the damage that was done, there would be little delay in the shipment of oil and its products to the Axis Powers. However, the reports indicate that the wells themselves were severely damaged and that oil gushed out of the ground in many places.

T. P. Sanders reports (The Oil and Gas Journal, Aug. 5, 1937, p. 42) that in the Buena Vista field in California, slow movement along a thrust fault has choked off wells penetrating the fault. This movement has not been accompanied by earthquake shocks of any magnitude and appears to be taking place at the rate of about 1½ in. per year. This suggests that there is a connection between wells damaged by earthquakes and thrust faulting.

Classification of Earthquakes

Earthquakes are generally classified on the basis of intensity, as measured by property damage and their effect on men or animals. They range from Class I, which are observable only by sensitive seismographs located near the epicenter, to Class X which are catastrophic in character. The Tokyo earthquake of 1923 was in this class. The Rumanian earthquake of this month has been placed in Class IX. The amount of shock, however, need not be related to the type of earthquake but only to the amount of strain which developed before relief. The Buena Vista movements may easily have been

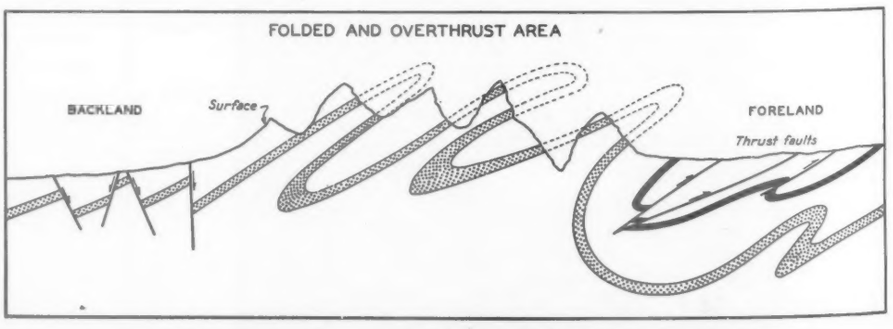


Fig. 1—Diagram showing types of faulting in a folded mountain range and the associated foreland and backland. The structures shown are greatly simplified

Recurrence of Rumanian 'Quakes Possible

The first reports of the Rumanian earthquake to reach this country probably overemphasized the damage done. This exaggeration was due to wishful thinking and to the normal tendency to overestimate damage done during earthquakes. These early reports were later modified and official statements minimized the extend of the damage done to surface structures but admi'ted that much damage had been done to the wells themselves.

Consideration of the regional geology of the district and of the different ways in which earth movements take place leads to the conclusion that the Rumanian earthquake was in the only type of area in which widespread serious damage to deep wells could take place. As the movement was associated with forward thrusts of the Carpathian Mountains and the Transylvanian Alps against the foreland, it was defini'ely shown that the movements which gave rise to these arcuate mountains are continuing. Experience shows that the strains which are set up in rocks are rarely relieved by a single shock and the possibility that there will be a recurrence of earthquakes in Rumania is very strong. The later shocks may be less intense than the first one, but there is an equally great possibility that the first shock acted as a trigger force which will set off one or more larger ones along the mountain front, although not necessarily in the area affected by the first shocks.

As operators in the United States are interested in this earthquake, both because of its possible effect on the war in Europe, and because of the possibility that similar experiences may be felt in the vicinity of their wells, the Rumanian earthquakes have been tied into a general classification of earthquakes in the accompanying article.

Class I earthquakes, but they damaged oil wells nevertheless.

The best type of classification is genetic and Table 1 presents such a classification of earthquakes.

TABLE 1—A CLASSIFICATION OF EARTHQUAKES

I. Earthquakes in areas of active mountain building:
   (*a*) In the foreland—thrusts.
   (*b*) In the folded area—flaws.
   (*c*) In the backland—normal faults.

II. Earthquakes in old mountain areas:
   (*a*) Collapsing ranges—normal faults.
   (*b*) Areas of lateral readjustment—vertical faults.

III. Earthquakes not associated with mountain building:
   (*a*) Volcanic shocks.
   (*b*) Deltaic overloading.
   (*c*) Torsional movements.
   (*d*) Continental collapse.

Earthquakes in Areas of Active Mountain Building

The causes of mountain building are still matters of controversy. Bitter warfare exists between the upholders of the theory of overthrusting and those who believe in underthrusting. The Alps represent parts of Italy which now lie on top of what was formerly Germany. Were the Alps pushed over Germany or was part of Germany pushed under the Alps? Fortunately, it doesn't matter. The result of the movements is that great sheets of rock were piled up in five overturned folds one above the other and were carved into the present Alps by erosion. Germany forms the foreland and the plains of northern Italy the backland of this system. (See Fig. 1.)

Almost everywhere there is a foredeep in front of these folded mountains. The deepest parts of the Pacific Ocean lie in front of the island arcs of Japan and the Philippines and along the west coast of South America. The backland of the Japanese arcs is the Japan Sea which is below water. In many places, the foredeep has been filled with detrital materials which form unconsolidated sediments of great thickness. The San Joaquin Valley of California, the Indus and Ganges valleys in India, the thick deposits of Tertiary Age around the Carpathian mountain front in Rumania and Poland are all examples of this formation of a foreland by filling of a foredeep.

As the mountains move forward over the foreland, they scoop up the soft sediments in front of them, forming a complexly folded area with low-angle faults. This movement is intensified if there are in the rocks involved masses of soft and plastic materials. In the Alps no rocks are involved in the overthrusts older than the Upper Triassic because the Upper Triassic sediments contain thick gypsum deposits which acted as a lubricant permitting the easy movement of the overlying rocks.

Salt is much more plastic than gypsum and the presence of a thick series of salt deposits in Rumania provided the locus for the movement of the foreland. In the United States, great domes of salt have pushed their way up through the coastal plain sediments for thousands of feet. In the North German Plain the same type of dome is found. However, farther south the domes are inclined and near the front of the Alps they are complexly folded and faulted. The Rumanian salt domes are of this overthrust type.

Fig. 2 shows the structure in the Campina district of Rumania. Here the position of the oil-bearing beds with respect to the salt deposits can be clearly seen. Remembering the example of the jar of jelly referred to above, and remembering that salt is the most plastic rock material, it can easily be seen that even if wells do not penetrate the thrust fault, they may still be collapsed by movements transmitted through the salt mass.

In the mountains themselves, there are, of course, great thrust faults, but movements along these faults do not appear to be accompanied by earthquake shocks nearly as much as movements along an entirely different type of fault. As the sheets are thrust forward, certain areas move more rapidly than the adjoining parts of the same sheet. Vertical cracks, known as flaws, develop at right angles to the strike and movements along these flaws cause earthquakes. These differ from the shocks in the foreland in that they affect only the overthrust masses themselves; that is, they are not deep-seated in origin and, as a consequence, do but little damage except locally.

As the thrusts develop, the backland tends to be elevated and, being poorly supported, tends to collapse. These movements take place along high-angle gravity faults. Shocks may be severe but they would do little damage to wells in the vicinity unless these wells actually traverse the fault plane.

Earthquakes in Old Mountain Areas

A mountain area is not in equilibrium with the surrounding area because of the fact that a great mass of rock has been piled up in a relatively limited area. It consequently tends to settle back to a level where it will be in equilibrium. Collapse generally takes place along faults which are more or less parallel to the strike of the formations, with the development of rift valleys. At the same time, there is lateral movement along these faults due to internal readjustments of some sort. These movements are deep-seated and may give rise to catastrophic earthquakes. They rarely affect oil wells, however, principally because the area in which they occur is not favorable to the accumulation of oil and there are no wells to affect. When projected into the foreland or backland, the faults do traverse oil fields, but the damage to wells is negligible compared with the damage to surface structures.

Earthquakes Not Associated With Mountain Building

Probably more earthquakes occur in the vicinity of volcanoes than in any other place. Molten material is transferred through the volcanic neck to the surface. The overloading above an area from which material has been removed causes collapse. The resultant earthquakes are usually limited in intensity and in the area affected.

The piling up of alluvial material by running water in valleys and at river mouths in the form of deltas causes overloading and often results in rupture of the bed rock. The faulting is, however, vertical or high-angled and there is little effect on wells in the area unless there is also some slumping of formations towards the sea.

A cause of faulting, although not definitely known to be of earthquake origin, is torsional movements of the earth's crust. These are slow horizontal movements of great masses, even of continents, and these movements result in strain and tear faults. It is possible that they have given rise to scattered earthquake shocks, but this is not known at present.

A fourth cause of earthquakes is collapse of areas on a continental scale. For some reason, not yet clearly explained, these faults have generally a north-south strike. As continental masses founder, these faults form and movements along them give rise to earthquakes. The Basin ranges of Utah and Nevada lie in such a belt, but the best known is probably the great Rift Valley of Africa. Here great faults cross the continent and have interrupted the drainage sufficiently to form great lakes. In this area the rocks are largely continental and, as in the case of the Great Basin, prospects for oil are not good enough to warrant drilling at present.

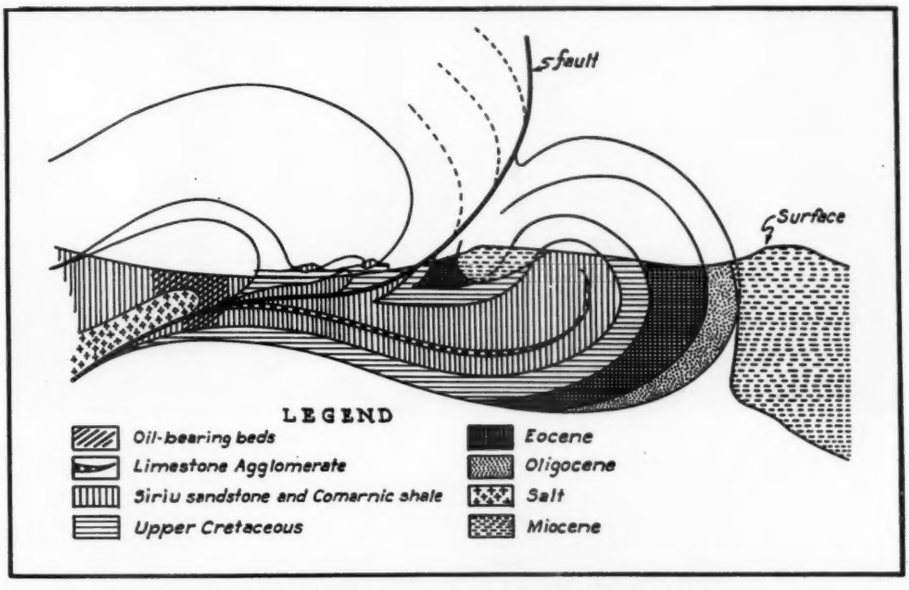


Fig. 2—Cross-section showing the relationship between oil deposits, salt and overthrust faults in the Rumanian foreland

However, even if oil were found in such a region, there would be little danger of widespread damage to fields in such an area because of the high-angled faults involved in the movement.

Summary

Of all of the types of earth movements, resulting in earthquakes, the only ones which endanger oil fields on a broad scale are those in the foreland of actively forming mountain ranges. These are found in California, Rumania and Poland, and, possibly, in Venezuela, Colombia, Iraq, Iran, Baku, the Dutch East Indies and other similarly situated areas. Based upon 80 years' experience in such areas, the chance of any single oil field being affected is of the order of one in several thousand. Two fields are known to have been affected, one of which involves movement along rocks of normal character. This is the Buena Vista field in California. In the other, the intensity and areal extent of the damage is increased by the presence of salt masses. This latter area, the Rumanian oil fields, has suffered serious damage at a time when it is of world-wide interest. The movements which started within the last few weeks may be expected to continue at intervals over a period of years, if experience in other active seismic areas is any criterion.

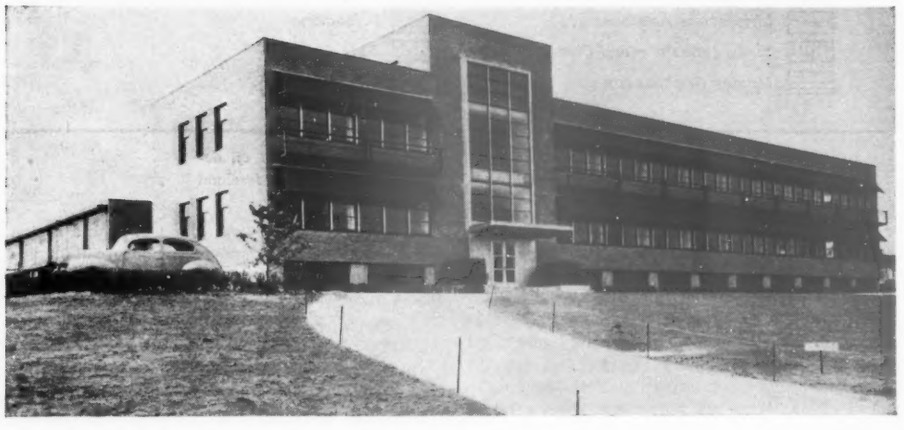
Modernity and Safety Feature Sun Oil's New Laboratory

By J. P. O'DONNELL

ANOTHER notable addition to the oil industry's growing investment in research and development work is the laboratory at Linwood, near Marcus Hook, Pa., of the Catalytic Development Co., developer of the Houdry catalytic cracking process. The growth of this laboratory more or less parallels the recent growth of research and development work in the oil industry which had its greatest impetus in the past decade. When the Sun Oil Co. first became interested in the Houdry process, a laboratory was opened at the Marcus Hook refinery. It consisted of one room in an unused end of a pump house. When early results gave promise, the laboratory was expanded until it occupied the entire building with approximately 3,000 sq. ft. of floor space. In contrast, the floor space of the two main buildings of the new laboratory alone approximates 32,000 sq. ft.

In later years two small additions were made to the first laboratory but it was still crowded and it was necessary to locate other sections of Houdry research activity in various buildings throughout the Sun refinery. Because of limited space, virtually all of the work was devoted to development and comparatively little to basic research. Development work was carried on in a small pilot plant.

The hitherto scattered operations are now essentially concentrated in the new installation which has a normal complement of about 125 men. They are under the direction of A. G. Peterkin, who is in charge of all laboratories; Dr. R. H. Newton, in charge of the development department; Dr. J. R. Bates, in charge of the research department, and H. P. Broom, who was formerly in charge of development work and is now liaison man between development and commercial operations.



Four buildings of the new laboratory have been completed. They include the research building, which also houses the test laboratory and offices; the development building, the machine shop, and the sample storage building. The fifth building which will house knock-testing equipment will be isolated to remove noise and vibration from the others. The buildings are most modern in both design and equipment. They were designed by an architect experienced in laboratory work who incorporated recommendations of the heads of the departments that were to use them.

The main building, a two-story structure, houses the research, test, and analytical laboratories, offices, recreation, shower, and locker rooms. Like the others, it is completely fireproof and it includes elaborate accident-prevention and safety equipment. Among them is a walkway, visible in an accompanying photograph, around the outside of the building on the second floor to provide a means of exit for a man trapped by fire between him and the door. Fire extinguishers, fire blankets, and emergency showers are also provided at readily accessible points. The building is air ventilated but not air cooled.

Ventilation System

Offices are ventilated by filtered fresh air and recirculated air which is heated in the winter and which may be cooled in the summer by the installation of a simple refrigeration unit. Fresh air only is supplied to the laboratories and is all exhausted through the hoods, recirculation being undesirable here because of the danger of toxic fumes. The ventilation system of the analytical laboratory is shown on these pages.

Offices in which both clerical and engineering work is done and the main test laboratory are on the first floor of this building. Routine tests such as distillation, flash and fire, gum determination, etc., are conducted in the test laboratory. Distillations of synthetic crude are made in a new type unit. The distillation flasks are enclosed in glass-cloth heating mantles by which heat may be applied evenly all over the surface of the flask. The reflux is magnetically controlled and the column is

Above, top: Dr. R. H. Newton, A. H. Peterkin, Dr. J. R. Bates and H. P. Broom

Above: Research building, housing research, test and analytical laboratories, offices, etc. Note second-floor safety walkway

Right: Corner of analytical laboratory, showing ventilation system

packed with Fenske helices. Ball, ground-glass joints are used for their greater flexibility. All such distillation work will be carried on in this type of unit because more accurate and consistent results can be obtained through the close control of distillation conditions which it provides.

Flash and fire equipment in this laboratory is in an enclosed room to prevent drafts. The balance room is also enclosed so that this work will not be affected by drafts. Other equipment in this laboratory includes two new "robot" Podbielniak columns, automatically controlled so that the operators may do auxiliary work; ice-making machinery; a gage tester for vapor-pressure gages which are tested each time a determination is made, etc. The ice-making machine has a capacity of 1 ton of shaved ice per day. The ice is transported to various departments in deep insulated bins mounted on trucks. Carbon dioxide snow is also provided for refrigeration in the research laboratory and liquid air is provided for the Podbielniak columns. Uniform condensing conditions are maintained in the laboratory by the circulation of 50° F. water which, by condensing all gases at the same temperature, makes comparable results possible. The test laboratory equipment also includes a large capacity refrigerator for sample storage.

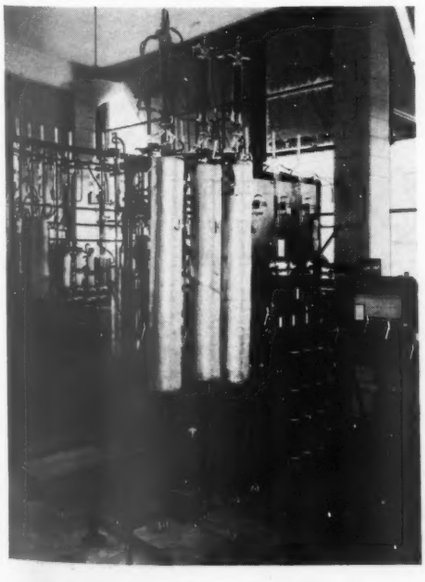
Second-Floor Equipment

The second floor of the main building is devoted principally to research though it also includes the analytical laboratories as well as the library and offices for the research chemists. The entire second floor is of one piece to eliminate any possibility of leaks. Each room is equipped, however, with a drain.

Equipment in the analytical laboratory, a corner of which is shown here, is entirely conventional. Utility outlets are contained in central channels and the benches are movable. Transit is used for hood bodies. The walls in all laboratories are of light cream-glazed brick which does not stain.

A number of the laboratories on the second floor are devoted exclusively to research. They include a distillation room in which three 8-ft. by 2-in. columns are installed with others yet to be added. The stainless steel columns are the equivalent of 25 to 30 plates and are enclosed in adiabatic insulation jackets. There are 36 leads for temperature recording on each unit.

Cases for testing sample catalysts on basis comparable to plant operation



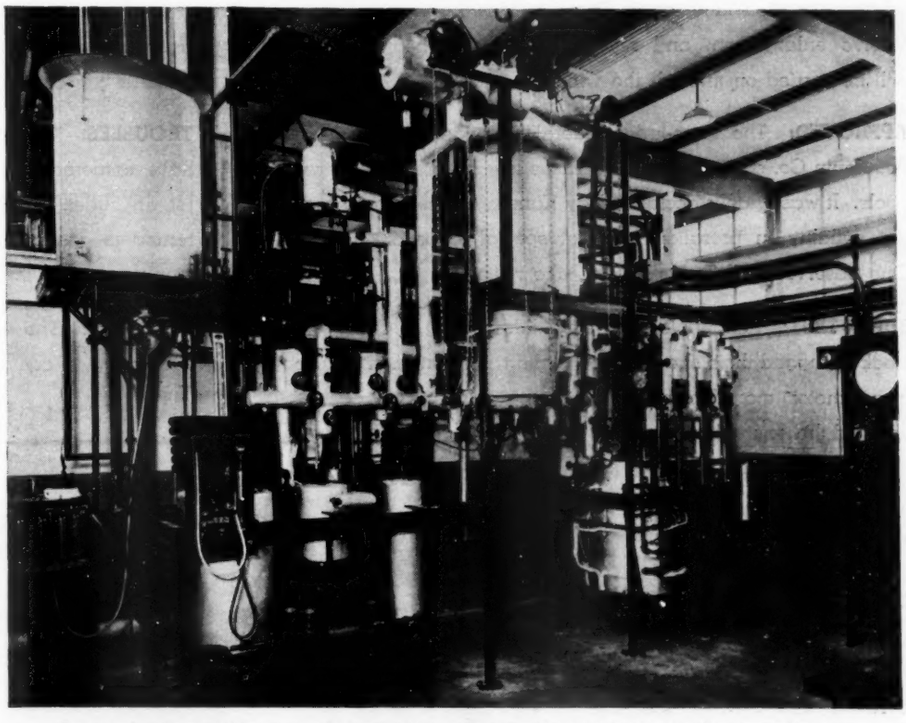
A separate room is devoted to organic analysis and a separate laboratory to testing experimental catalysts. Separate equipment is provided for testing catalysts for various purposes. A photograph shows one set of three cases for testing small samples of catalysts on a basis comparable to plant operation. The laboratory adjoins the experimental catalyst preparation laboratory which has equipment for washing, filtering and drying the proposed catalyst, a ball mill, earthenware jars for reactive solutions, etc. A catalyst granulator and pellet-making equipment are in the basement.

The rest of the second floor is devoted to an enclosed balance room, a small store room for equipment used regularly on the second floor and a small shop which also contains glass-blowing equipment. Air filtering and circulation equipment and a water still are in the penthouse.

In the basement, which is high enough to have nearly full-size windows and thereby obtain good light, are glassware washing and storage rooms, a white print machine, locker, lavatory, six-stall shower, lunch and recreation rooms. Equipment for obtaining hot water by exchange with steam is also in the basement. Multiple-shelved carts are used for transporting the glassware. Transportation of heavy equipment between floors is accomplished by a small electrically operated elevator.

In the development building, shown here, processing experiments that may be translated into full-scale operations are carried on as well as work on the engineering problems encountered in the development processes and in the design of full-scale plants. The building houses seven separate laboratories in which are located 12 pilot-type catalytic cracking units, one of which is shown, with room for four or five more. Like the research building, this building is also safety equipped including fire blankets and numerous extinguishers. Despite insulation, processing at 800° F. gives off considerable heat so that air circulation, by which the ratio of fresh to return air is controlled, is essential. Eight roof fans maintain constant circulation and two radiator grilles in the base of the walls of each room carry off heavy vapors through a central duct below the floor. Suction in the duct is provided by two fans to guard against interruption since it is unlikely that both fans will fail at the same time.

The equipment in both buildings is electrically heated. Water-cooled rheostats are used for controlling current in the development laboratory while variable voltage transformers are used in the research building. The use of a "Buss-Wa" system in the development building makes it possible to install outlets at any point around the building. Four thousand amperes at 110 volts are available in the development laboratory. Each of the laboratories in the development building has a small, fully equipped office, porch and laboratory bench. The porches are used for temporary storage of the particular oil being run since containers of more than 5-gal. capacity are not permitted to be taken into the laboratory. Each laboratory includes one to three units so placed as to have ample working space all around them. Location of the offices provide full vision of the development laboratories, an unusual feature which permits all development engineers to observe the work in which they are interested.



One of the dozen pilot-type catalytic cracking units now installed in the development laboratory

Steam is supplied at about 150 lb. pressure for process and, after pressure reduction, for heating. Among other purposes the steam provides vacuum for the entire development laboratory through a steam ejector. The vacuum obtained is as good as in commercial installations and the maintenance is practically nil.

Gasoline samples are kept in a cold room where a temperature of 40° to 50° F. is maintained by special refrigeration equipment while drums of heavy oil are kept in a hot room where the temperature inside the insulated drum compartment is maintained at 150° F.

Since some comparatively heavy equipment is used in the development laboratory a manually operated 2-ton overhead crane traveling the length of the building is available. Trucks can be driven into one end of the laboratory and, by means of the crane, equipment can be removed and placed anywhere in the laboratory.

SPARKS . . . FROM THE NEWS

TO END ALL VOLUMES: The Mexican Government has summarized the history of its oil industry in a Paul Bunyan vest-pocket edition, 9 x 13 in., 881 pages.

ANTICIPATING 1941: Prospects for the need of increased crude-oil transportation facilities in Texas in 1941 have stimulated extensive enlargement and reconditioning pipe-line work which will be carried on through the winter months.

APPROVED: The three-judge federal court decision in the Bay Petroleum Co. case upheld the Kansas law for proration between pools. It was widely acclaimed by Kansas oil men "as recognizing equality in proration and not special favor or privilege." One observer said Texas should take notice.

SUPER TEST: Refiners leaving the A.P.I. meeting in Chicago last week shrugged their shoulders regarding the statement that one large motor manufacturer had adopted the equivalent of a continuous 4,000-mile drive at 60 miles per hour as a basis for testing motor fuels.

ON ORDER: Mussolini's deal for Rumanian oil is only half an answer. The negotiators failed to reveal how best to close the eyes of the alert British Mediterranean fleet.

CHEAP POWER: Since 1925 the "per horsepower" cost of automobile engines has dropped from $32 to $8 with a reduction of approximately 50 per cent in gasoline costs exclusive of taxes.

DELICATE PATIENT: Relapse of the natural-gasoline market maintains the reputation of that product as being one of the most sensitive in the industry. The transfused life blood of October coastwise business had no staying qualities.

JITTERS: The deepening of a Devonian well in Salem to the Trenton will give many Mid-Continent operators the jitters until the test is completed.

SUPPORT GROWS: While the Texas Railroad Commission debates the past, present and future of oil conservation in that state, additional oil associations go on record as favoring a separate oil and gas commission to administer conservation regulations.

TROUBLES: Operators in the Hobart, Okla., field claim they have cornered the trouble market. They waited nearly a year for an outlet. Then they found their long-shut-in oil wells had turned to gas and that crude in storage tanks had jellied and would not flow through the gates.

IN DOUBT: The election gives Illinois a new governor and a new party in control. Unfortunately there is still a doubt as to whether this means any change in the state's attitude toward conservation and the needed co-operation with other oil states.

TWENTY-FOURTH STATE? A Georgia wildcat is testing a reported show of oil. Will the Cracker State make it an even 2 dozen?

DON'T LOOK NOW: But the excess of 1940 gasoline stocks over 1939 amounting to nearly 11,000,000 bbl. on October 5 has dwindled to 5,487,000 bbl.

OVERTIME: Managements are working overtime trying to apply the new wage and hour regulations without having a bookkeeper in the office for each employe.

RECOGNITION: Another major oil company has shown its faith in the Forest City basin, with the purchase of the producing wells and acreage owned by the discoverer of the Falls City pool.

EXTRA! EXTRA! . . .

J. J. Conry, right, president, Carter Oil Co., gives W. G. Skelly, president of the Skelly Oil Co., some folding money for a newspaper. Mr. Skelly was one of several oil men and business leaders who sold newspapers on the streets of Tulsa Tuesday as part of the campaign to raise funds for the Tulsa Community Fund. Reports from all parts of the country show that oil men have had a prominent part in raising charity funds this fall.

New Proration Basis Proposed At Texas State-Wide Hearing

AUSTIN, Tex., Nov. 19.—Testimony and discussion at the state-wide proration hearing held here today and Monday centered chiefly around a proposal that a common yardstick be adopted in prorating the state's allowable among the various fields. Also entering the discussion were charges of widespread selective buying, and although there was a general recommendation for continued curtailment most of the companies testifying at the hearing asked for allowable increases in specific fields. The Bureau of Mines reported a decrease of 14,000 bbl. in demand for Texas oil during December, but purchasers' nominations totaled 55,421 bbl. more than September nominations. The Railroad Commission in conducting the hearing, therefore, directed inquiries into the disparity between the federal forecast and nominations in an attempt to determine why such a wide margin existed.

Proposal that a yardstick be adopted which would be applicable to all Texas fields was made by Hines Baker, attorney for Humble Oil & Refining Co. As a general method, he suggested a formula based on 50 per cent acreage and 50 per cent on the ability of the well to produce, but pointed out there would have to be exceptions. These were mainly Gulf Coast fields where the divergence in sand thickness and other factors would require that reserves be taken into consideration.

Upon questioning by Jack Blalock, Houston attorney, Mr. Baker admitted use of the formula would act to increase Humble's production by 5 or 6 per cent, but added that the company buys 2 bbl. of oil for every barrel it produces. Due to the lengthy testimony of Mr. Baker, which was much along the line of reasoning of the Humble open letter published on this page, the hearing was resumed on Tuesday morning. At that time application of the proposed formula to various fields was pointed out.

While there were some supporters on the Humble proposal, there also was opposition. Mr. Blalock was quick to become spokesman for this group, attacking the yardstick. He pointed out various minor points, and stated that if he could find so many in such a short time, others would find more within the next few months. It was his contention that the various claims of reserves from the pools would create a much more difficult job for the Railroad Commission in arriving at an equitable allowable for the state. Mr. Baker defended his yardstick on the grounds that it would be better than the present "hit and miss" system.

While the Bureau of Mines forecast a drop from 1,291,000 to 1,277,000 bbl. for Texas oil in December, the lowest since March 1397, the commission announced purchaser nominations totaled 1,735,918 bbl. for December, or 55,421 more than in September. While several company representatives spoke against selective buying, when queried by Commissioner E. O. Thompson and others, none asked for a reduction in the allowable of a given field and all affirmed purchaser nominations. A few asked that allowables in some fields remain unchanged and nearly all companies asked for increased production in some pool or other.

That another 90-day order, covering December, January and February was at least being considered by the commission, was indicated by Chairman Lon A. Smith who stated "this may be the last hearing in 1940."

ASSOCIATIONS URGE NEW COMMISSION

Move for the formation of a new three-man commission to take over the duties of the present Texas Railroad Commission in the regulation of oil and gas production is gaining momentum in that state. Last week four Texas oil and gas associations passed resolutions asking the next legislature to create a separate commission to regulate and supervise the industry. These associations were the West Central Texas Oil and Gas Association, East Texas Oil Association, Panhandle Producers and Royalty Owners Association and the Permian Basin Oil Association.

In a majority of the resolutions a three-man body appointed by the governor and approved by the senate was favored, with the salaries to be paid from revenues obtained from the industry. Likewise, they felt the Railroad Commission was overburdened by regulating the industry's activities and that a separate body would be better able to cope with the intricacies of administering proration.

A bill providing for the creation of a new commission will be introduced early in the forthcoming session of the state legislature, informed sources state. Before the group convenes in January it is probable that every oil association in Texas will have taken action on the proposal.

Texas Oil Proration Adminstration Criticized in Humble Letter

HOUSTON, Tex.—An attack on the policies and practices of the Railroad Commission in its administration of oil proration in Texas was made by Humble Oil & Refining Co. last Saturday in an open letter to all producers and royalty owners from whom it purchases crude oil. In the letter, which was signed by H. C. Wiess, president, it was the company's contention that inequities in allowables as between fields have created a condition which threatens the successful continuance of the whole proration and marketing system under which the oil industry operates. Specific alleged inequities in allowables were pointed out, and the commission's lenient policy in regard to granting allowable increases was deplored.

The letter follows:

To those from whom we purchase oil:

We are disturbed by conditions facing the oil industry today which threaten to do harm to you and to us and to the state as a whole, dependent as we all are on oil for our welfare. Since we are mutually interested in the same industry and in view of our relationship with you as purchasers of your crude, we are prompted to write to you and discuss some of the problems which we meet in carrying on our business as a producer and buyer of crude and a seller of crude and products, and which must be solved if such threatened harm is to be avoided.

In our opinion, present conditions in the industry are worse than at any time since the chaotic days of serious overproduction in East Texas when the price of crude was driven far below the average cost of production. Disparities and maladjustments within the industry have become so great that they will force major adjustments unless soon corrected. Frequent changes in statistical and economic relationships always characterize the industry, and so long as these changes do not go too far or last too long they do not upset the industry.

However, present signs show unmistakably that something is basically wrong and must be corrected before we can see the light of day. This is clearly revealed by the charts which present graphically the significant developments in the industry during the past 4 years. They show that there have been violent fluctuations in crude production in Texas; that the value of products derived from a barrel of crude has declined very sharply; that per-well production has decreased 25 per cent as a result of an addition of 26,000 oil wells; that exports of crude and products have declined sharply, particularly from the Texas Gulf Coast, and that stocks of gasoline and all petroleum products have increased substantially since 1937.

Cause of Bad Conditions

All agree that conditions are bad, but there is absence of agreement as to the cause. It is a human failing to seek to blame others for one's troubles, and oil men are not exempt from this failing. We hear them attribute the difficulties of the industry to excessive production in other states, to unduly large imports, or to bad practices in the refining and marketing branches of the industry. It is true that some or all of these factors have contributed to our present troubles. However, there are other factors which have led to maladjustments as a result of developments over which we in Texas have immediate control. In order to appreciate the problems, we must first understand the basic principles of proration and their importance to the operation of the oil industry today.

The oil industry is a very large business, ranking among the three or four largest in this country, which affects our way of life in many ways. It is a very complex industry which, because of the nature of the irreplaceable resource which it produces, is faced with many difficult problems. Public interest in oil requires that there be conservation of it, and this has led various oil-producing states to establish regulation over the industry in order to prevent waste. Since this regulation was first generally used during the 1920's, there has been a period of adjustment in which the industry has sought to work out principles which will promote efficiency and justice. The problem has been a complicated one requiring the best thought and effort of all in the industry. Outstanding among the principles evolved for handling the business is the system of ratable takings, and the regulation of production to market demand.

These principles are basic to the system of posted

prices, which bring the markets of the world to the lease of every producer. Without them, there would be chaos in the industry and regulation would fail to achieve its purpose of conservation and equity. Unfortunately, these essential principles have been and are being disregarded, and this disregard endangers the entire structure of the industry.

There are two practices in particular which have a disturbing influence upon the industry and are undermining its stability. The first of these practices is the constant changing of state and field allowables and production above and below market demand, resulting in sudden additions to stocks and violent drafts on stocks, so that neither the producer, nor the purchaser, nor the refiner can plan his business intelligently or anticipate what is coming next. The attached chart shows the tremendous fluctuations which have occurred in Texas' production and the erratic changes from periods of surplus production to periods of withdrawals from stocks. The demand for Texas' crude does not change rapidly. It is relatively easy to predict the market requirement for crude, and the operations of the industry would be greatly facilitated if production were regulated uniformly in relation to demand instead of with violent fluctuations above and below it.

Closely related to the practice of permitting violent fluctuations in the production of the state is the wide variation which occurs in the production of individual fields. In many fields the production has fluctuated as much as 100 per cent during months of this year. Some fields are given high allowables in one month and cut back the following month while an exactly opposite policy may be pursued in regard to other fields. Such changes complicate the operations of both producers and purchasers.

The wide variations in allowables can be illustrated by the situation for the Rincon field, where within a period of a few months the daily allowable was first cut from 2,300 bbl. to 1,200 bbl. and then increased to 5,250 bbl. Under present conditions, when a purchaser enters a field he has no certainty that the connections which he acquires will continue to have the same allowable. So long as there is a vacillating policy which results in constant changes in allowables, purchasers and marketers are unable to conclude sales in safety because of fears of shortages or are reluctant to take on additional connections because of the dangers of being flooded with a surplus.

No Effective Yardsticks

The second of these practices which disturbs the industry is the failure to establish and observe any effective yardsticks or principles for the allocation of allowable production among the pools of the state. The problem of allocating production in a reasonable manner between pools has become of increasing importance as the number of producing fields and wells has grown rapidly. One illustration will be used here to indicate precisely how discrimination occurs and its extent. Any number of similar illustrations could be given.

We will compare the Plymouth and Greta fields in Southwest Texas, both of which produce relatively comparable crudes and are substantially similar with regard to reserves and producing conditions. In January 1937 the daily per-well allowable was 100 bbl. in Plymouth and 69 bbl. in Greta. In March 1940 the daily per-well allowable was 72 bbl. in Plymouth and only 21 in Greta. At this time wells in the Plymouth field were getting more than three times those in the Greta field, whereas in 1937 they were getting only 40 per cent more. In August 1940 the daily per-well allowable was 32 bbl. in Plymouth and 17 bbl. in Greta, a difference of nearly 100 per cent. In October 1940 the daily allowable per well was 33 bbl. in Plymouth and 20 bbl. in Greta, a variation of 65 per cent. The same degree of variation exists in the allowables per acre for these two fields, since the spacing of wells is approximately the same. This will illustrate how discrimination has increased since 1937 and how rapidly it fluctuates even at the present time.

The reason for the increasing importance of equity between fields can be demonstrated readily by comparing 1937 and 1940. In 1937, Texas had daily production of 1,398,000 bbl. from an average of 72,000 wells, or 19.4 bbl. per well. In 1940, Texas will have daily production of about 1,340,000 bbl. from an average of 92,500 wells, or only 14.5 bbl. per well. The decline in daily production of proratable wells, excluding marginal wells as defined by statute, has been from 31 bbl. in 1937 to about 19.5 bbl. in 1940, a decrease of 37 per cent. Under circumstances such as these, where declining allowables are necessary generally because of a constantly increasing number of wells and a declining market outlet, it becomes increasingly important for all fields to be treated on a uniform and reasonable basis. If some fields are favored, by not having their allowables reduced, then the burden of reduction all falls with increasing force on other fields.

The extent of inequality between fields has been seriously aggravated during the last several months by the granting of exemptions from shutdown orders at a time when shutdown days have increased to nine per month. In January 1940 there were 62 fields, with 7,500 wells and schedule allowable of 176,000 bbl. per day exempt from the shutdowns. When the proration order was issued for September it included exemptions for 145 fields with 20,000 wells and schedule allowable of 450,000 bbl. By the latter part of October there were approximately 180 fields with an exempt allowable of 550,000 bbl. per day, excluding the exempt marginal wells with production of 130,000 barrels per day. Early in November most of the exemptions from shutdowns were canceled for this month, but there still remained nearly 40 exempt fields and there is no assurance that the practice of granting exemptions will not soon be resumed.

Discriminatory Practices

The growth of this practice of exempting some fields from the shutdowns is grossly discriminatory to the other fields in the state. It has become a common practice to make numerous changes in field allowables after the proration order for a given month is issued. During the month of July, 63 fields were granted exemptions from the shutdowns, and 15 fields were granted increases in allowables. These fields gained nearly 50,000 bbl. per day by the changes which were granted to them. In the month of August, 40 fields were added to the list of those exempt and four had their allowables increased, the net gain to these 44 fields being nearly 28,000 bbl. per day. These figures illustrate the unpredictable changes which occur from day to day and complicate operations in the industry.

The practice of granting high allowables or exemptions from shutdowns to some fields can not be defended on the ground that the particular field enjoys a special market demand for oil which can be produced without waste. In this connection it should be recognized that there are relatively few different grades of crude, and any particular grade is produced in several fields. Therefore, the practice of attributing a stated increase in market demand to one particular field producing a given grade of crude is discriminatory to other fields producing the same grade of crude and equally entitled to consideration. If this practice is continued and extended it will result in purchasers securing their crude supplies from selected fields, leaving other fields either entirely without markets, or with materially reduced markets. This in itself is a serious threat to the stability of the oil industry, as proration must be based on the principle that all producers of a given grade of crude shall share ratably in the market outlet.

Many operators take the attitude that these inequities affect only the producers whose allowable is involved, and show no interest in the problem when satisfied with their own allowables. As a matter of fact, inequitable allowables have a broader effect because they tend to upset the market and thereby harm all of us. The result of granting unduly high allowables to some fields is to provide a source of low-cost crude to those who purchase or refine such crude, either because the current cost of production is reduced as a result of high allowables, or because the producer is able and willing to sell at a lower price to dispose of his added volume and realize a quick return. In either case, the result is to give to those who receive unduly high allowables an artificial competitive advantage, with damage to the market structure generally. It becomes difficult to maintain the posted price principle, which is the keystone of the industry's marketing system.

This is illustrated by recent developments in Southwest Texas, where high allowables have resulted in oil moving at prices which are from 10 to 30 cents per barrel below the prevailing level. Crude from several fields in this area is threatening to bring about a general reduction in prices, because it is going to market at a much lower price than other crudes in the same area. If one refiner is able to purchase crude at 21 cents per barrel less than his competitor, he thereby enjoys a differential advantage of ½ cent per gallon on his products, which puts him in a superior competitive position and literally forces competing refiners to seek lower-priced crude in self-defense. The conservation laws are for the purpose of preventing waste, and when applied should bear equitably upon all those who are subject to them. They should not be administered in such way as to influence price artificially, either up or down.

Threaten Proration and Marketing Systems

In short, the conditions outlined above threaten the successful continuance of the whole proration and marketing system under which the industry operates; they threaten the principle of ratable participation by all producers in the markets; they threaten the stability of the crude-price structure through artificial action; they threaten to prevent extension of pipe-line outlets to new pools, because purchasers will prefer to secure all the oil they need from their present connections, and they threaten the entire system of posted prices by which the producer gets the going price at the lease for his oil currently as it is produced.

Conditions will be materially improved if the industry and the conservation authorities operate the proration program so as:

1. To keep the state's production on a stable basis within the Bureau of Mines estimate of demand and without repeated fluctuations above and below this figure.

2. To apply some equitable yardsticks or principles for the allocation of allowables among pools, and to adhere to these principles over a period of time with a view to the establishment and maintenance of equity and of stable producing and purchasing conditions; and

3. To recognize that the demand for a given grade of crude should not be allocated to or supplied from a given field, but that all pools producing this grade of crude should share equitably in the total demand for the general grade involved.

The producer who seeks excessive allowables from his fields and the purchaser who undertakes to secure his demand from a few selected fields with such high allowables are pursuing a shortsighted policy, destructive in the end to themselves as well as to the industry.

This situation requires the intelligent action of all members of the industry and all conservation bodies in the several states for its correction and for the establishment of sound practices and the basis for stable conditions.

Three-Point Reform Program

Suggested corrections advanced by Humble's President Wiess in his letter were:

1. That the state's production be kept on a stable basis within the Bureau of Mines estimate of demand and without repeated fluctuations above and below this figure.

2. Some equitable yardsticks or principles be applied for the allocation of allowables among pools, and to adhere to these principles over a period of time with a view to the establishment and maintenance of equity and of stable producing and purchasing conditions.

3. That the demand for a given grade of crude should not be allocated to or supplied from a given field, but that all pools producing this grade of crude should share equitably in the total demand for the general grade involved.

Interstate Compact Commission Endorsed by A.P.I. at Meeting

THE board of directors of the American Petroleum Institute at their final session last week during the twenty-first annual meeting of the Institute adopted resolutions pledging the support of the petroleum industry to the national-defense program and also again expressed their approval of the Interstate Oil Compact Commission.

In the first resolution the directors pointed out that "the petroleum industry as presently constituted under a system of competitive enterprise, in addition to ordinary peacetime requirements, is amply able and willing to meet any demand which the U. S. Government may make upon it for petroleum products for any and all needs."

The second resolution took cognizance of the fact that the time for renewal of the compact was drawing near and expressed the conviction that both state and federal governments should pass the necessary legislation for its continuance. The board expressed the belief that if the compact were continued, states not now members would enter, and concluded "said (compact) commission has performed a useful service and is capable of greatly increased usefulness in effecting a wise conservation of the petroleum resources of the nation and substantially assisting in the program of national defense."

Sites for the coming midyear meeting and for the next annual session were announced by the board of directors. The midyear meeting will be held in Tulsa May 19-23, 1941, and the twenty-second annual meeting will be held in San Francisco, Calif., November 3-7, 1941.

All Officers Reelected

All officers of the Institute were retained, Axtell J. Byles, New York, remaining as president; George A. Hill, Jr., Houston Oil Co. of Texas, Houston, Tex., vice president for production; J. Howard Pew, Sun Oil Co., Philadelphia, Pa., vice president for refining; E. V. Weber, Eureka Oil Co., Cincinnati, Ohio, vice president for marketing; W. R. Boyd, Jr., New York, executive vice president; O. D. Donnell, Ohio Oil Co., Findlay, Ohio, treasurer; Lacey Walker, of New York, secretary and assistant treasurer; and J. S. Cooke, of New York, assistant secretary.

Two changes were made in the personnel of the executive committee, H. D. Collier, of Standard Oil Co. of California, San Francisco, Calif., succeeding the late W. H. Berg, of the same company, and Reese Taylor, of Union Oil Co. of California, Los Angeles, Calif., succeeding L. B. Simmons, of Rock Island Refining Co., Duncan, Okla.

Two changes were made by the board in the membership of the American Petroleum Industries Committee, the other members being reelected at the meeting. L. A. Gibbons, of Union Oil Co. of California, Los Angeles, was elected a member to succeed Paul M. Gregg, of the same company, resigned, and Buell S. Jones, of Standard Oil Co. (Indiana), Chicago, was elected member to succeed the late W. J. Guthrie, of Gulf Oil Corp., Pittsburgh, Pa. The board created an additional membership, which is later to be filled.

Five new members of the board of directors were elected to fill vacancies created by expiring terms. Fifty other directors were also reelected.

New directors are: C. L. Henderson, Vickers Petroleum Co., Wichita, Kans., to succeed L. B. Simmons, of Rock Island Refining Co., Duncan, Okla., as director in the Central United States production group; W. L. Childs, Reed Roller Bit Co., Houston, Tex., to succeed E. S. Dulin, Byron Jackson Co., Los Angeles, Calif., and Percy C. Jones, S. M. Jones Co., Toledo, Ohio, to succeed A. E. Walker, National Supply Co., Pittsburgh, Pa., as directors in the supply group.

Directors-at-large chosen by the board of directors are: Ralph B. Lloyd, Lloyd Corp., Los Angeles, to succeed Neal Anderson, Pilot Oil Co., Torrance, Calif., and Parker Melvin, president of Pennsylvania Grade Crude Oil Association, Bradford, Pa., to succeed former President W. Floyd Clinger, of Warren, Pa.

Two technical papers presented at the A.P.I. meeting in Chicago last week appear in this issue. These are:

"Trends in Automobile Design Match Evolution in Fuels," by T. A. Boyd and W. G. Lovell, General Motors Corp., Page 42.

"Heavy-Duty Motor Oils," by H. C. Mougey, of General Motors Corp., Page 50.

Several other technical papers, together with a report of the meeting and of the general addresses appeared in the A.P.I. Issue of The Oil and Gas Journal last week.

Reduce Casing Sizes

Principal change in A.P.I. standards announced at the meeting was the recommendation to adopt a new casing list designed to reduce to less than 90 the number of different sizes and grades of casing used by the petroleum industry. At present there are more than 200 different sizes and grades of casing listed in the A.P.I. standards. The recommendation came from the Institute's Production Division of the standardization committee.

The new list has not been finally ratified, but this action is expected to follow in the near future. In the meantime the present list will be retained as standard.

Pipe-Line Coatings

Of special significance to pipe-line constructors and operators was the final report of the 10-year test of different protective coatings for pipe lines. The test was started in 1930 by the A.P.I., the National Bureau of Standards, and the manufacturers of protective coatings. Report of the results of the tests was delivered at the meeting by K. H. Logan, National Bureau of Standards, who supervised the final inspection of the specimens. One of the important facts brought by the tests was the failure of many coatings to uniformly protect the pipe.

Reservoir performance factors were discussed broadly in papers delivered by R. D. Wyckoff and M. Muskat, of the Gulf Research & Development Co. They brought out the factors that affect the sand's performance, the methods that should be used in determining the magnitude of these factors, and their significance in planning an operating program for each field. The papers were not intended to bring any new developments before the industry but were designed to correlate the various factors which bear on scientific recovery of oil from the sands.

Progress of accident prevention reported at the meeting showed that strides taken in this field during 1939 were greater than during 1938. Preliminary reports for 1940 indicate that the record for this year may not be as favorable as last year. Special attention was directed toward the employes of the Baton Rouge refinery, Standard Oil Co. of Louisiana, who worked 203 days (4,216,600 man-hours) without a single lost-time industrial accident.

An automatic fire extinguisher built into tank trucks may result in a reduction in the losses due to fires in this type vehicle. The device is still in the experimental stage. Other safety discussions included the application of accident-prevention measures and devices and the teaching of safety practices to older employes.

Discuss Lubricants

An interesting discussion of the paper (p. 50) by H. C. Mougey, General Motors Research Corp., followed its presentation at the Thursday meeting of refiners' division. Because of Mr. Mougey's experience in the laboratories and testing grounds of the General Motors Corp., his statement was received with unusual interest. He said that the company had standardized on the equivalent of a continuous 4,000-mile grind for checking lubricants used in gasoline engines and a 30,000-mile run for the diesel engine. Various refiners considered these tests quite severe. In commenting upon this point, Dr. J. C. Geniesse, of the Atlantic Refining Co., said: "The refining industry understands that it must continue to improve the quality of its motor oils as in the past, but the laboratory tests by which oils are judged must follow practical lines. It is entirely possible that if the motorist who uses the oil in his routine driving will change it reasonably often his engine will last longer."

Dr. J. R. MacGregor, of the Standard Oil Co. of California, stated that he liked to consider the oil as being used to allow for a liberal margin of safety. He compared the safety factor used in designing steel members of buildings to the margin of safety allowed between oil changes. He favored a much more liberal safety margin than the 4,000-mile and 30,000-mile tests used by General Motors as a basis for judging oils. Other lubrication authorities supported these views and they generally agreed also that road performance and not laboratory tests will serve as the only conclusive basis for judging lubricating oils. In concluding the discussion Ludlow Clayden, of the Sun Oil Co., said: "Regardless of the demands of

(Continued on Page 24)

STATE CAPITALS...

KANSAS

THE KANSAS CORPORATION COMMISSION'S right to divide the state's oil market equitably among the prorated fields was upheld by a three-judge federal court in an opinion issued last week. The opinion written by Judge Sam G. Bratton, New Mexico, senior member of the Circuit Court of Appeals, and District Judge Richard J. Hopkins of Kansas, held the commission was within its rights in limiting production in the Otis pool of Rush and Barton counties. Circuit Judge Walter A. Huxman of Kansas, third member of the court, dissented from the majority opinion. Plaintiffs were the Bay Petroleum Corp., Denver, Colo., and the partnership of Morgan, Cobb & Flynn, Tulsa, operators in the Otis pool who supply oil to the Bay refinery at McPherson, Kans.

The opinion dissolved a temporary restraining order granted by Judge Hopkins against the commission in September 1939 after the commission canceled special allowables previously granted the pool. Theo A. Morgan, conservation director, said production of approximately 14,000 bbl. a month in the pool was at stake in the action. The Corporation Commission abolished special allowables for the pool in May 1939 following revision of the Kansas proration law, Mr. Morgan said, and ordered production in the pool fixed at about 11,000 bbl. a month. Under the temporary order against the commission, wells in the pool were permitted to run about 25,000 bbl. of oil a month, he stated, and the commission asked for a three-judge court to hear the case.

"If excess production is allowed in one prorated pool, even without physical waste there," Judge Bratton's opinion said, "total production will exceed total market demands and that condition contributes to physical and economic waste as well as industrial instability.

"It thus seems reasonably clear that if the provisions in the statute and the orders of the commission under and through which production in the Otis pool is being restricted to an amount allocated thereto in accordance with the statute, bear a real and substantial relation to the prevention of physical and economic waste of the oil industry in the state even though the quantity which it is desired to produce can be produced without actual physical waste in that particular pool, considered separate, apart and distinct from other pools."

In his dissent, Judge Huxman said: "I have grave doubts as to the constitutionality of the statute which authorizes the state to regulate the correlative rights as between pools without reference to the element of waste and more doubt as to the reasonableness of the challenge to regulation. If we once hold that the state may not only regulate this industry affected with a paramount public interest in order to prevent waste but that it also may divide and allocate the market to different consumers or producers disassociated from some form of waste, then we have destroyed the last remaining vestige of free enterprise and have completely regimented the oil industry."

THE CORPORATION COMMISSION has announced the December allowable hearing to determine the market demand for Kansas crude and natural gas will be held in Wichita on November 28.

THE CANTON GAS FIELD of McPherson County was brought under proration last week by the Kansas Corporation Commission in an order which said gas drainage and waste existed in the field. The 11-well field has an open flow of approximately 60,000,000 cu. ft. daily and has had a market demand averaging 1,600,000 cu. ft. daily the last few months, the commission said, but "no effort has been made by the producers to produce their wells so as to prevent drainage or migration of gas between developed leases."

The commission contended that in some of the combination oil-gas wells "as much as 131,000 cu. ft. of gas has been produced for each barrel of oil" run and ordered that henceforth "not more than 3,000 cu. ft. of gas should be produced for each barrel of oil." Market demand and allowables for the wells will be determined by the commission under the order.

MICHIGAN

THE REDDING FIELD of Clare County, only prorated district in Michigan, has been assigned a net November allowable of 422,602 bbl. The figure is based on a flat allowable for 97 wells in the field, less overproduction for the previous period. The field went into October with 332,808 bbl. of production and storage for September with pipe-line runs in September totaling 316,046 bbl. Storage at the end of September amounted to 16,762 bbl. Estimated production for the field in November is approximately 296,000 bbl.

TEXAS

ONLY A SMALL GAIN in Texas' allowable production was shown last week, with the indicated actual production remaining within the demand estimate of the Bureau of Mines, according to a summary compiled by the Oil and Gas Division of the Railroad Commission on Saturday. Daily average allowable was calculated at 1,311,721 bbl., a gain of 10,674 bbl. from a week ago. The permitted flow was 20,721 bbl. daily above the bureau's estimate of a demand for 1,291,000 bbl., but deduction for underproduction at 3 per cent, as indicated by recent months, would lower actual output by 39,352 bbl., holding it 18,631 bbl. under the federal forecast.

The bureau, however, has forecast a demand of 1,277,000 bbl. daily during November, 14,000 bbl. less than in October, so that the state's allowable production is about 34,000 bbl. above the November demand level.

Gains were due to quota increases permitted a few fields and accretion due to addition of new wells to the schedules. The basic allowable, which may be produced on operating days, rose 4,858 bbl. to 1,757,630 bbl., while the net daily average, exclusive of production exempt from the 9 shutdown days, gained 3,402 bbl. to 1,230,341 bbl. Exempt oil rose 7,272 bbl. to a daily average of 81,380 bbl.

All proration districts showed increases except East Texas, for which a new calculation was incomplete. After checking 288 wells, the commission staff found 4 dead wells and 20 others incapable of making their allowable, which will reduce the field total by a small amount. Its average, prior to the elimination, was 366,909 bbl.

Average daily allowables for other districts and the change from last week were, in barrels: Southwest Texas, 211,420, up 4,732; Gulf Coast, 224,043, up 48; East Central, 78,042, up 3,825; West Central, 50,588, up 101; West Texas, 201,181, up 1,142; North Texas, 116,634, up 657, and Panhandle, 62,904, up 169.

Action taken at the state-wide proration hearing held in Austin on Monday is reported on Page 15 of this issue.

A TOTAL OF SIX OIL FIELDS last week won exemption from the requirement that they shut down all production during the remainder of November. All exemptions were retroactive to November 9, first of 7 shutdown days from which the fields were exempted. The exemptions came upon the heels of an order issued a fortnight ago in which all shutdown exemptions had been wiped out.

The exempted fields were: Sulphur Bluff, Talco and Cayuga of East Texas, because their asphalt-base crude is used in road work upon national-defense projects; Eureka Heights, Harris County, because Crown Central Petroleum Co. refinery in Houston claimed to have a shortage of this crude, basis for heating oils, and Midway field in San Patricio County and Minnie Bock field in Nueces County, because of the large amount of water production.

THE U. S. SUPREME COURT on Monday refused to reconsider a decision announced June 3 which sustained an order of the Railroad Commission, as applied to the Rowan & Nichols Oil Co. Todd-B lease in the East Texas field and upholding the commission's potential basis of proration in that field. Rowan & Nichols had claimed that the potential method prevented it from recovering its fair share of the field's daily production and that the field should be prorated on an oil-in-place basis. In the June 3 decision, the court held the question was one for the commission's judgment.

Applying for a rehearing, the company said the opinion, as amended last October 21, recognized that jurisdiction included "power to determine whether or not the plan of proration is void for failure to distribute the field allowable among the producers 'on a reasonable basis' as required by a Texas statute." The court was asked either to determine this issue or expressly refuse to do so.

CALIFORNIA

THE CALIFORNIA CONSERVATION COMMITTEE will hold its regular monthly meeting within the next few days to set the allowable for the month of December. Indications point to the probability that the state's allotment will remain unchanged although there may be a few minor changes in administration. The committee is chiefly concerned in enforcing the curtailment program as it is felt that if this can be accomplished it will greatly strengthen the market and make further changes unnecessary during the next several months. It has been pointed out several times that if effective curtailment could be realized it would be possible for the committee to raise the top-well allotment as well as revise upward the allowable for intermediate wells. There are a few areas in which effective curtailment can not be expected due to conditions outside the sphere of the oil industry but many fields overproducing represent lack of compliance. It is the general expectation that conditions will run along as at present until the end of the year unless something unforeseen develops. Sales and purchase commitments are now being made for 1941 and while it is too early to form any opinion the outlook appears favorable for the early part of the new year as far as offshore business is concerned.

LOUISIANA

AT THE REGULAR NOVEMBER state-wide hearing held in New Orleans last week, Conservation Commissioner B. A. Hardey requested the aid of Louisiana oil companies in surveying the state's crude reserves as a national-defense measure. In addition to a detailed report on Louisiana reserves, Conservation Department officials will send to Washington a survey of crudes, including analyses of all grades produced in the state, to aid the Government in placing facilities for manufacture of 100-octane aviation fuel in Louisiana.

All purchasers of crude in Louisiana placed nominations with the Conservation Department, for proposed December allowables. With the exception of two major purchasers in coastal Louisiana, nominations in that section showed an increase, particularly in crudes adaptable for fuel-oil manufacture. Aside from the greater demand in low-gravity crudes, the demand for Louisiana oil remains steady. The order allocating production for December will be issued November 23.

the OIL AND GAS JOURNAL

PRODUCING REFINING NATURAL GASOLINE PIPE LINE

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Post Election

The manner in which leaders of industry ended the apathy and confusion of the past and rallied to the support of the political, economic and social issues at stake, was the most heartening development of the recent campaign.

The fact that these same leaders now refuse to accept the election returns as the end of the principles for which they fought is even more encouraging. The predicted defeatist attitude has not developed.

On the contrary, everywhere there is a feeling that the rising tide of opposition to destructive activities of Government—so apparent during the summer and fall months—will continue. Adequate leadership, for several years conspicuous by its absence, is assured.

This feeling was outstanding among oil men at the A.P.I. annual meeting last week. Similar reports come from all parts of the oil country.

The Institute's sessions gave additional answers to those who attack. That every division of the industry's operations is prepared to do its part in carrying out the defense program was fully explained.

So far as the principal products—motor fuels, lubricants and fuel oils—required by the military forces are concerned, the demands regardless of the scope of the defense program will be but a small fraction of the current consumption by motor vehicles and industry. Provided there is no interference with operations, prices will continue low and the Government will turn over to the industry an insignificant part of the billions being spent.

Reports at committee meetings and technical sessions revealed that research and development work and the perfection of operating technique, which are the basic explanation of why this industry is prepared, continue apace with greater accomplishments assured for the future. Technicians will continue to anticipate, not follow, the requirements of the military.

While pledging full support to the defense program, the industry has no intention of retreating from its solid front of opposition to federal control of its activities. Claims of a mandate as a result of the election or the pretext of an emergency which will not develop so far as the oil industry is concerned are possible sources of attack which will be challenged by an aroused industry.

Furthermore, operators generally will not give support to those who, on the pretense of protecting or strengthening the position of smaller interests, attack large units and thus attempt to crumble the entire industry from within.

The industry made important gains in the election. Indicative of what can be done through united action, the well-laid plans to increase the state gasoline-tax burdens and to divert these tax funds to uses other than the construction and maintenance of highways were unsuccessful without exception.

Motorists have become tax conscious and there will be no further increases if they are permitted to express themselves as they have done several times over the past 2 years in state and municipal elections. This fact should be kept in mind should the expected efforts to increase the present federal taxes on gasoline and lubricants materialize after the first of the year.

All industry will have more friends during the coming year. The old and new in Congress will have a greater appreciation of the fact that there are pressing problems of governmental procedure which require immediate attention. They realize that nothing is to be gained in the solution of these problems by hamstringing productive enterprise.

These are times for industrial vigilantes, fully cooperative in those matters which are constructive and at the same time alert to the dangers inherent in all political emergencies.

Officers of the newly formed American Association of Oil Well Drilling Contractors: J. E. Brantly, president; C. J. Paine, secretary-treasurer, and W. S. Churchill, vice president of rotary drilling

Oil-Well Drillers Organize and Elect Officers at A.P.I. Meeting

A MEETING of the newly formed American Association of Oil Well Drilling Contractors held in Chicago last week resulted in the election of officers, part of the directors and the adoption of the bylaws of the organization.

The organization proposes to conduct an educational campaign among the employes of its sustaining members; provide a means of discussion of drilling methods and practices; promote studies to reduce drilling costs and simplify cost accounting, and improve the organization of accident-prevention work in the drilling industry.

President of the association is J. E. Brantly, Drilling & Exploration Co., Los Angeles, Calif.; Harry L. Edwards, Houston, Tex., was chosen vice president at large; W. S. Churchill, Arrow Drilling Co., Tulsa, vice president of rotary drilling; J. J. Klise, Wooster, Ohio, vice president of cable-tool drilling, and C. J. Paine, Paine Drilling Co., Dallas, Tex., secretary-treasurer.

Under the bylaws of the organization there will be six classes of members accepted. Senior members will consist of those occupying executive, administrative, or professional positions down to and including the rank of tool pusher. Junior members will take in employes of drilling contractors below the rank of tool pusher. Other classes of members include associate members, sustaining members, contributing members, and honorary members.

Assessment of dues for the sustaining members will be based on the number and size (depth capacity) of active rigs owned by each contractor.

Attending the meeting were the following drilling contractors: W. I. (Bill) Lewis, Mount Vernon, Ill.; Burr Lambert, Centralia, Ill.; Walter Tschudin, Pioneer Drilling Co., Salem, Ill.; John J. Moran, Moran Brothers, Inc., Wichita Falls, Tex.; Arch Rowan, Rowan Drilling Co., Fort Worth, Tex., and George Livermore, George P. Livermore, Inc., Odessa, Tex.

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DEATHS

JOHN E. RITCHEY, 64, Venango County, Pennsylvania, oil producer and former Venango County commissioner, died November 10 when he was stricken while marching with war veterans to an Armistice Day memorial service. Mr. Ritchey, who was a Spanish-American war veteran, died within a few minutes after he was taken ill. He was chairman of Venango County draft board No. 1.

GEORGE WHITLING, 58, employe of the Sterling Oil Co. plant of the Quaker State Oil Refining Corp., was found dead in the woods while on a hunting trip, November 13. Dr. S. G. Foster, Venango County coroner, said Mr. Whitling's skull was fractured when a dead chestnut tree was blown over and struck him on the head. The body was found after a search of 20 hours.

JOSHUA S. COSDEN, 59, former president of the Cosden Oil Co., of Fort Worth, Tex., died aboard a train at Willcox, Ariz., en route to El Paso, Tex., from Palm Springs, Calif., November 17. Death was attributed to heart failure. Mr. Cosden was a colorful figure in the oil business, in which he made several fortunes, only to see them vanish. At the time of his death his oil interests consisted principally of a refinery in Wynnewood, Okla., and the Cosco Pipe Line Co. His widow and a son survive.

ALBERT G. W. BIDDLE, 44, died at his home in Olney, Ill., following a long illness with heart trouble. Mr. Biddle has been a prominent oil operator in Oklahoma for 22 years. For 8 years he was associated with the Texas Co. in Tulsa and Houston, and as credit manager for the Phillips Petroleum Co. He is survived by his wife and three sons.

ROBERT L. DOLING, 72, a 20-year-service man with the Mid-Continent Petroleum Corp., Tulsa, died November 17 at his home following an illness of 2 years. Mr. Doling retired from active service 2 years ago after an injury suffered while working.

EDWARD J. BRADY, 61, Tulsa, who has been employed by the Texas Co. for the past 22 years, died November 13. He had been a resident of Tulsa for 25 years. Survivors include the widow, a stepson and two daughters.

CHARLES A. McFADDEN, 81, prominent oil producer in the Bradford, Pa., oil field, and resident of Derrick City, Pa., for more than 50 years, died November 16 at a Bradford hospital. He had been ill for several weeks of complications accompanying advanced age, and has been in the hospital for 2 weeks. Surviving him are his wife and a daughter.

R. G. DAILY, 70, president of Daily Crude Oil Co., Alma, Mich., died November 11, following a sudden heart attack. The body was taken to New Lexington, Ohio, for burial. In addition to the Alma office, the Daily company has offices in Newark, Ohio.

MALCOLM G. VILAS, 83, former secretary and treasurer of the original Standard Oil Co. of Ohio, died November 12 at his home in Cleveland.

WILLIAM A. WEBBER, 68, drilling contractor, died November 16 of a heart attack at his home in Okmulgee, Okla. Survivors are the widow, a daughter and two sons.

R. T. ECHELBERGER, 91, retired employe of the Kendall Refining Co., Bradford, Pa., died last week at the home of his sister in Emlenton, Pa. Two sons survive.

GEORGE E. COPELLA, 23, of Barnum Road, Olean, N. Y., an employe of the Mix Creek Oil Co., died of injuries received when the car he was driving plunged over an embankment November 9. Two girls, his sister, Miss Martha Copella, and his fiancee, Miss Fay Bish, 16, whom he planned to wed within a few weeks, were injured but not seriously.

GEORGE W. BEATTY, 86, former Venango County, Pennsylvania, oil-field worker, died at his home in Sharon, Pa., on November 8. Death was caused by a stroke suffered while hunting a week previously. He leaves four sons and a daughter.

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December Crude-Oil Demand Estimated at 3,560,000 Bbl. Daily

WASHINGTON, D. C., Nov. 19.—The Bureau of Mines today estimated market demand for December will require a daily average of 3,560,000 bbl. of crude oil, or 10,000 bbl. below November.

Domestic demand for motor fuel in December is estimated as 46,400,000 bbl., or 6 per cent higher than actual for December 1939. Estimate for exports of motor fuel is 1,800,000 bbl., or 100,000 bbl. higher than in November, but 1,300,000 bbl. less than actual exports in December 1939.

Stocks of finished and unfinished gasoline are estimated at 80,400,000 bbl. as of October 31 and the bureau estimates reduction of 900,000 bbl. in November and increase of 3,200,000 bbl. in December.

Other estimates are: Refinery production of gasoline, 50,220,000 bbl.; domestic runs to stills, 3,466,000 bbl. daily; foreign crude runs to stills, 3,600,000 bbl.; crude exports, 3,900,000 bbl.; fuel and losses, 2,600,000 bbl.

Estimated daily average crude demand by principal producing states:

Texas, 1,277,000 bbl.; California, 593,900; Oklahoma, 422,600; Illinois, 363,600; Louisiana, 280,300; Kansas, 188,400; New Mexico, 100,600; Wyoming, 74,500; and Arkansas, 66,100.

Illinois Pipe Line Co. Abandons Variable Purchase Schedule

WOOD RIVER, Ill., Nov. 19.—The variable purchase schedule in the stripper fields of Illinois and Indiana has been abandoned by Illinois Pipe Line Co., a subsidiary of Ohio Oil Co. The company is now running 100 per cent of production from stripper properties to which it is connected in the older producing fields of the two states.

During the peak of Illinois basin production the company ran restricted amounts of oil. Resumption of unrestricted purchases in the stripper fields indicates the more active demand developing in nearby sources of supply to take the place of declining outrut from the flush areas.

Developments in Foreign Policy Can Shortly Be Expected

By HENRY D. RALPH

WASHINGTON, D. C., Nov. 18.—Important developments in this nation's foreign policy can be expected in the next few months, including an expansion of the Good Neighbor policy toward Latin America which will have a wide bearing on American investments in oil properties there.

Real significance is attached to President Roosevelt's designation of Henry A. Wallace, vice-president-elect, as his personal representative at the inauguration of General Manuel Avila Camancho as president of Mexico on December 1. Observers believe that this is more than a gesture of good will and that the occasion will be used to announce concrete measures to improve relations between the two countries. Since one of the chief obstacles to better relations is the controvery over Mexican expropriation of American-owned oil properties, the assumption is that some formula will be agreed upon for making compensation for these properties. The settlement probably will have to be a compromise, since both governments must "save face," but it will have to be a practical one if the administration hopes to succeed with its program with the other American republics.

If this Government should completely forgive Mexico for the oil confiscation it would be backing down on its traditional policy, expressed several times by Secretary of State Hull, of insisting on prompt and adequate compensation for the expropriation of property of American citizens by foreign nations. This would be a signal for other countries to the south to take similar steps wherever convenient and would mean that little or no American capital would be invested in any sort of industrial enterprises in South American countries. These countries are very much in need of such capital to develop their resources and industries, particularly now that European trade is so curtailed, and the Roosevelt administration is most anxious to use American capital as one means of strengthening economic, political and cultural ties within the Western Hemisphere.

Cannot Make New Demands

On the other hand, the administration cannot very well make new demands on Mexico, such as a return of the properties to their former American owners, since it has already recognized the legality, under the Mexican Constitution, of the expropriation provided compensation is made, and a disposition to impose a harsh settlement on Mexico would undermine confidence in the Good Neighbor policy in other countries and would seriously interfere with the administration's hopes of weaning those countries away from economic dependence on Germany and Italy.

The incoming Mexican administration apparently is less closely allied with the radical interests which have been dominant in that country in recent years, and the State Department seems to feel that the basis exists for much closer cooperation and mutual understanding between the two countries. Each country now wants something from the other, so the time is at hand to drive a bargain. Mexico wants loans and credits from the United States, while the United States wants Mexico to cooperate actively in the program of hemisphere defense and opposition to German-Italian-Japanese infiltration.

Details of a possible oil settlement can only be guessed at, and while it probably will not completely satisfy the American claimants it will probably involve Mexican retention of the properties but management by American technicians and at least "token" compensation over a period of years under an arrangement which will maintain this Government's position that American capital invested abroad must be protected.

With the Mexican oil dispute out of the way, the two countries probably will enter a defensive pact similar to that which we have with Canada, and there are reports that Mexico will offer us naval and air bases on condition that the United States spend considerable sums in developing them, dredging harbors, and building highways. But it is difficult to see how this Government could make Mexico a loan or spend money on improvements in that country without settling the oil controversy in a way which will make it clear to other nations that American investments may not be confiscated.

Drastic revisions in the relationship between the Government and the petroleum industry are suggested in measures now pending action by the Chamber of Deputies. The changes proposed by President Lazaro Cardenas are apparently designed to place the nation in a position from which it can make a definite commitment on indemnification for expropriated properties, a prerequisite to satisfying the Department of State.

President Cardenas plans to place the Mexican petroleum organization, which consists largely of workers, on an individual responsible basis. He visualizes creation of a responsible corporation which will retain 25 per cent of the profits and hand 75 per cent to the Government. It is presumed that part of the profits accruing to the national Government would be applied to indemnification of the American and British companies.

Other Nations Seeking Loans

Other South American nations are also looking to the United States for loans, so any Mexican agreement may serve as a precedent. A prime example is Bolivia, which also expropriated American oil properties without compensation, and now seeks new capital and also a market for its tin ore in this country. Warren Lee Pierson, head of the U. S. Export-Import Bank, was recently in Bolivia discussing trade relations, and is understood to have made settlement of the oil matter a precedent to further investment of United States capital in that country. Mr. Pierson also visited other South American countries, including Argentina, which recently obtained a $20,000,000 credit here, part of which it may use in building a pipe line to bring crude oil to tidewater refineries, thus displacing imports of American petroleum.

This brings up another phase of Latin-American relations which must be determined by the administration before going far with its present program. While there are said to be no restrictions on the Argentine loan, it has been an unwritten policy of this Government not to make loans for the development of industries which would compete with American business, and Brazil was once refused credits for the construction of refineries to handle Mexican crude. The Export-Import Bank has been given increased lending power, and loans to South American countries now believed to be under negotiation are an important part of the program of obtaining cooperation within the hemisphere, but as yet there is no clear understanding of the purposes for which such credits may be used.

In the Orient, the administration is moving with great caution, and there is no immediate prospect that it will impose a complete embargo of petroleum to Japan. The present embargo on shipments of aviation gasoline was represented as an internal-defense measure rather than as an overt action against Japan. Moreover, Japan's recent success in obtaining the promise of much additional petroleum from the Netherlands East Indies suggests that a complete embargo of American oil would not hamper Japanese military activities greatly.

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Regulation of Water Shipments

SHIPMENT of petroleum products by water, other than in bulk tankers, will come under the regulation of the Bureau of Marine Inspection and Navigation of the Department of Commerce on April 9, 1941, under the terms of the so-called Bland Act., approved by the president October 9. Tentative regulations have been issued by the bureau, and public hearings have been scheduled for December 9 to 14 in Washington.

Until this act was passed, regulation of water shipment of dangerous articles was governed by laws many years old, and jurisdiction was divided between the Department of Commerce and the Interstate Commerce Commission. The new law modernized the statute and gives complete control to the bureau, but requires it to adopt I.C.C. regulations wherever appropriate. The transportation of inflammable or combustible liquids in bulk is covered by another statute, but with the exception of tankers, work boats and pleasure vessels, the new law applies to vessels of all description in foreign or domestic commerce, whether under the American flag or not, in any navigable waters subject to the jurisdiction of the United States.

The proposed regulations follow established I.C.C. regulation as to definitions, descriptive names, packing, marking, labeling, and container specifications, so shippers accustomed to shipping petroleum products by rail will not have to adopt any new practices. Additional regulations, however, govern storage and stowage on board vessels, whether common, contract, or private carriers. The regulations also apply to combustible liquids with a flash point of 80° or more, although such liquids are not regulated by the I.C.C. when shipped by rail or truck.

Interstate Compact Commission Endorsed by A.P.I. at Meeting

(Continued from Page 17)

the automotive engineers and the ability of refiners to meet or exceed these demands, the two industries should not move too rapidly and impose hardships upon each other similar to the 'octane race' in motor fuels." He stressed the importance of choosing informative and appropriate names for new oils as they are developed and warned against allowing the commercialization of new names to rush the claimed performance of these oils faster than the inferred superiority can be demonstrated.

C. M. Larson, of the Sinclair Refining Co., injected another warning by saying "Do not build up the cost of your oil by blending in additives which cost more than the oil itself." He was followed, however, by several other authorities who said that initial oil cost was of little importance if the higher-priced oils offered longer, safe operation of the motors, especially airplane motors.

H. H. James, of E. I. du Pont de Nemours & Co., then outlined and illustrated the procedure used for painting tanks with a new white paint which chalked to expose a clean surface. The development indicated that a tank so painted absorbed less heat than one painted with aluminum. No mention was made, however, of the relative visibilities of the two sets of tanks and this factor appears to be important in the minds of those refiners at least who are charged with making their equipment relatively invisible from the air as part of the federal Government's program of "blacking out" refineries, gasoline plants, storage tanks and pumping stations.

Among the various refinery committees which met, that dealing with the subject of wastes offered the conclusion of 3 years of work in the form of a report. This contains data on the design of waste-water separators, a procedure for testing water for oil and tar and the identification and treatment of emulsions.

●

THE MARKETS*

CRUDE OIL: Other purchasers have joined in the advance of 15 cents for Pennsylvania Grade crude oil instituted November 12 by South Penn Oil Co., making the improvement uniform in that part of the country. Other crude markets are steady. The market is particularly strong in the Middle West and tending to the soft side in Texas with the future there dependent on the new Railroad Commission order and its administration.

REFINERY: Natural-gasoline prices turned soft in the Mid-Continent this week on resistance of Gulf Coast refiners who have experienced disappointing coastwise business so far this month compared to October. Neutrals and bright stocks are moving more freely in Pennsylvania where gasoline also is strong. Distillate fuel oils are strong in most districts although winter demand has been too brief to elevate prices.

TANK-WAGON AND POSTED DEALER: Gasoline prices in the New York and New England district were raised last week 0.2 to 0.5 cent per gallon at several points, partly to offset higher tanker rates. Scattered price adjustments in tank-car and tank-wagon prices were made in various parts of the country but were not of a general character.

FINANCIAL: Oil securities gained more ground in an advance that has been uninterrupted for 3 consecutive weeks. The average of 30 representative stocks for the week ended November 16: High, 24.40; low, 22.86; close, 23.75. Week ended November 9: High, 23.82; low, 21.81; close, 23.37.

*Detailed information in Market Section.

B. of M. 9-Months' Figures Show Rise Over 1939

WASHINGTON, D. C., Nov. 19.—The indicated domestic demand for crude oil in the first 9 months this year was 987,365,000 bbl., an increase of 5.7 per cent over the same period in 1939, the Bureau of Mines report for September recently released discloses.

The domestic demand for 440,130,000 bbl. of motor fuel in the first 9 months is 6.9 per cent greater than a year ago.

UNITED STATES SUPPLY AND DEMAND

Nine months, 1940 and 1939. (All figures in thousands of barrels)

Crude Oil

9 months—	Total supply	Total demand	Excess Demand	Excess Pct.	Domestic production	Imports	Indicated domestic demand‡	Exports	Stocks refinable crude Sept. 30‖
1940	1,051,263	1,027,817	*23,446	*2.3	1,021,005	30,258	987,365	40,452	263,124
Daily average	3,865	3,751	.....	..	3,726	110	3,604	148	.....
1939	947,897	989,284	41,387	4.2	923,361	24,536	934,137	55,147	234,555
Daily average	3,472	3,624	.....	...	3,382	90	3,422	202	.....
Increase, 1940	103,366	38,533	.....	...	97,644	5,722	53,228	†14,695	28,569
	10.9%	3.9%	.....	...	10.6%	23.3%	5.7%	†26.6%	12.2%

Refinery Products—Motor Fuel

9 months—	Total supply	Total demand	Excess Demand	Excess Pct.	Domestic production	Imports	Domestic demand	Exports	Stocks Sept. 30‖
1940	460,131	458,900	*1,231	*0.3	460,052	79	440,130	18,770	82,953
Daily average	1,679	1,675	.....	...	1,679	....	1,606	69	.....
1939	447,931	447,321	*610	*0.1	447,925	6	411,901	35,420	71,389
Daily average	1,641	1,639	.....	...	1,641	.....	1,503	129	.....
Increase, 1940	12,200	11,579	.....	...	12,127	73	28,229	†16,650	11,564
	2.7%	2.5%	.....	...	2.7%	1,217.0%	6.9%	†47.0%	16.2%

Kerosene

1940	54,196	51,518	*2,678	*5.2	54.061	135	48,592	2,926	10,254
1939	50,916	48,763	*2,153	*4.4	50,916	.....	42,846	5,917	9,952
Increase, 1940	3,280	2,755	.....	...	3,145	.....	5,746	†2,991	302
	6.4%	5.6%	.....	...	6.2%	.....	13.4%	†50.5%	3.0%

Gas Oil and Residual Fuel Oil¶

1940	393,770	384,111	*9,659	*2.5	371,466	22,304	356,068	28,043	143,775
1939	357,448	366,958	9,510	2.6	344,733	12,715	328,049	38,909	138,201
Increase, 1940	36,322	17,153	.....	..	26,733	9,589	28,019	†10,866	5,574
	10.2%	4.7%	.....	...	7.8%	75.4%	8.5%	†27.9%	4.0%

Gas Oil and Distillate Fuels

1940	139,606	129,326	*10,280	*7.9	137,242	2,364	113,747	15,579	48,828
1939	118,634	121,475	2,841	2.3	118,463	171	96,324	25,151	38,138
Increase, 1940	20,972	7,851	.....	...	18,779	2,193	17,423	†9,572	10,690
	17.7%	6.5%	.....	...	15.9%	1,282.4%	18.1%	†38.1%	28.0%

Residual Fuel Oils

1940	254,164	254,785	621	0.2	234,224	19,940	242,321	12,464	94,947
1939	238,814	245,483	6,669	2.7	226,270	12,544	231,725	13,758	100,063
Increase, 1940	15,350	9,302	.....	...	7,954	7,396	10,596	†1,294	†5,116
	6.4%	3.8%	.....	...	3.5%	59.0%	4.6%	†9.4%	†5.1%

Lubricating Oils

1940	27,925	26,471	*1.454	*5.5	27,925	.. ...	17,851	8,620	8,596
1939	24,706	25,701	995	3.8	24,706	.. .	17,205	8,496	6,704
Increase, 1940	3,219	770	.....	...	3,219	.....	646	124	1,892
	13.0%	3.0%	.....	...	13.0%	.....	3.8%	1.5%	28.2%

Petroleum Wax (Thousands of pounds)

1940	476,378	416,297	*60,081	*14.4	382,480	93,898	257,103	159,194	110,028
1939	441,694	387,552	*54,142	*14.0	322,560	119.134	201,073	186,479	89,584
Increase, 1940	34,684	28,745	.....	...	59,920	†25,236	56,030	†27,285	20,444
	7.9%	7.4%	.....	...	18.6%	†21.2%	27.9%	†14.6%	22.8%

*Excess supply. †Decrease. ‡Crude only. §Includes finished and unfinished refinery gasoline and natural gasolines. ¶Gas oil and fuel oil equals gas oil and distillate fuels plus residual. Note: Total supply equals domestic production plus imports. Total demand equals domestic demand plus exports. Data on demand for refined products based on refinery shipments. ‖Does not include 12,562,000 bbl. of heavy oils in California. Comparable figure for September 30, 1939, 14,085,000.

Crude Oil Run to Stills and Total All Oils

9 months—	Total imports§	Total exports§	Total crude to stills	Per cent yield gasoline‡	Natural gasoline production	Total supply all oils*	Total demand all oils*	Stocks all oils Sept. 30*
1940	59,671	102,435	969,822	43.0	40,411	1,123,378	1,071,329	576,819
Daily average	218	377	3,539	...	147	4,100	3,910	.....
1939	44,545	145,878	916,109	44.7	36,557	1,006,102	1,044,589	528,559
Daily average	163	535	3,356	...	134	3,685	3,826	.....
Increase, 1940	15,126	†43,443	53,713	...	3,854	117,276	26,740	48,260
	34.0%	†29.8%	5.9%	...	10.5%	11.7%	2.6%	9.1%

*Total all oils includes crude and refined products, natural gasoline and benzol. Stocks September 30, 1940, represented 148 days' supply, which compares to 138 days on the same date in 1939. †Decrease. ‡Does not include natural gasoline blended at refineries. §Includes crude oil and refinery products. In case of imports includes receipts in bond and for domestic use. All data based on Bureau of Mines reports.

International

Rumania . .

Shipments to Germany Near Record Breaking

SHIPMENTS of Rumanian petroleum to Germany may reach a total of 1,400,000 tons (approximately 10,500,000 bbl.) by the end of December, according to an analysis of movement overland and through the Danube dispatched from Bucharest. If the total of 1,400,000 tons is attained in exports to Germany this year it will represent next to the largest year of trade with the Reich in the history of the Rumanian petroleum industry. The peak was established in 1936 when shipments to Germany totaled 1,705,000 tons. The 1939 trade between Rumania and the Reich aggregated 1,285,000 tons.

Despite the earthquake 2 weeks ago and the nearness of the season when Danube water traffic is interrupted normally by ice, the shipments to Germany are continuing at an increasing rate.

American oil men in Bucharest have expressed the belief shipments to Germany may approach 200,000 tons this month and the same in December.

The volume of 1940 shipments is all the more impressive in consideration of the severe nature of last winter. Shipments were confined to overland routes until the middle of March.

The earthquake, reports this week indicate, did not seriously damage the railways. Some of the refining capacity will be out of service for indefinite periods, but closure of normal export business through the Mediterranean during recent months has caused stocks within Rumania to back up almost to the limit of storage facilities.

Japan . .

Agreement Will Curtail California Shipments

A CONTRACTION of 7,000,000 to 8,000,000 bbl. in the Japanese demand for California petroleum in 1941 appears probable as the result of the agreement reached last week between Japan and the Netherlands East Indies.

Japan will receive 1,800,000 tons (approximately 12,750,000 bbl.) of crude oil and petroleum products from the Netherlands East Indies in 1941 under the agreement. Negotiations were concluded at Batavia between Dutch colonial and oil-company officials and Tadaharu Mukai, chairman of the Mitsui companies. The Standard-Vacuum and the Rising Sun Petroleum Co., Japanese subsidiary of the Royal Dutch-Shell, will act as importers for Japan.

Standard-Vacuum and Shell subsidiaries, Nederlandsche Koloniale Petroleum Mij. and de Bataafsche Petroleum Mij., respectively, are the largest and only important operating companies in the Netherlands East Indies. They own the producing and refining facilities in the approximate relationship of 60 per cent by Shell and 40 per cent by Standard-Vacuum.

Under the new agreement Japan will receive approximately 760,000 tons of crude (approximately 6,000,000 bbl.) and 546,000 tons of refined products (about 4,250,000 bbl.) The new contracts, covering 1,306,000 tons, are in addition to the total of 494,000 tons annually supplied under previous arrangements.

The Department of State at Washington and the British Foreign Office were reported advised of the progress of negotiations and it is therefore assumed that official approval was given the agreement by governments of the countries in which the companies are domiciled.

Tension between Japan and the Netherlands East Indies may be eased by conclusion of the agreement since petroleum supplies for the Nipponese Government were the chief stake in the friction that developed. An embargo on aviation gasoline exports from the United States to Japan compelled a search elsewhere for supplies with which to fuel the Japanese war machine in China.

Both Standard-Vacuum and Shell refineries in the Netherlands East Indies are qualified to make comparatively small amounts of aviation gasoline.

Colombia . .

Court Decision Does Not Affect Two Major Fields

THE major producing fields of Colombia, Tropical Oil Co.'s De Mares concession and Colombian Petroleum Co.'s Barco concession, are believed not affected by decision of the Supreme Court of that country a few weeks ago. The court decision held that approximately 80 per cent of the prospective oil lands previously considered private property should be returned to the nation.

The position of International Petroleum Co., subsidiary of Imperial Oil Co., Ltd., is not directly affected, according to company officials in Toronto, Canada.

The officials are inclined to interpret the decision as referring to companies having exploration rights on private property. International's interest in Colombia is chiefly confined to the De Mares concession operated by Tropical Oil Co., a subsidiary organization. Production for 1939 was 22,086,646 bbl. and the output this year has been at approximately the same rate.

In regard to private property, titles to such land are in a precarious position owing to the fact that in a revolution some years ago, titles to many properties were burned in the general upheaval, leaving fertile ground for disputes as to ownership.

Colombian Petroleum Co.'s Barco concession in the eastern part of the country was conveyed to the company by an act of the national congress which appears sufficient to take precedence over the ruling recently rendered in the title dispute.

Venezuela . .

September Production Slumps 22,300 Bbl.

DAILY average crude-oil production for September in Venezuela slumped to 485,120 bbl., a reduction of 22,300 bbl. from the output in August.

The reduction was fairly evenly distributed among the producing areas. Bachaquero, Socororo and Quiriquire were the only fields to show production gains in September over the rate of output in August.

There are now 25 producing fields listed in the Venezuelan report. The total includes individual listing of the Lake Maracaibo fields and several of these are actually related in all respects excepting in names.

Exports from Venezuela declined to 12,025,550 bbl. in September, a loss of 2,415,905 bbl. compared to offshore movement in August. The reduction in exports is further evidence of the adverse effect of the European war on South American oil markets. The production figures for August and September by companies and fields follow:

(All figures in barrels)

Companies—	Sept.	Aug.
Caribbean Petroleum Co.	885,045	1,023,820
Venezuelan Oil Concessions, Ltd.	3,966,075	4,430,175
Colon Development Co.	506,520	548,245
Lago Petroleum Corp.	3,428,140	3,800,050
Mene Grande Oil Co.	3,369,765	3,620,080
British Controlled Oilfields, Ltd.	20,335	22,590
Central Area Exploitation Co.	51,500	55,810
Standard Oil Co. of Venezuela	2,304,235	2,194,050
Compania de Petroleo Lago	19,655	26,385
Tocuyo Oilfields of Ven., Ltd.	155	.....
Socony-Vacuum Oil Co.	885	2,660
Texas Co. (Venezuela), Ltd.	1,360	6,240
Total	14,553,670	15,730,105

Fields—	Sept.	Aug.
Cabimas	1,239,425	1,617,635
Lagunillas	4,847,210	5,227,135
Tia Juana	2,733,345	3,007,775
Bachaquero	187,015	178,935
La Concepcion	58,355	63,845
La Paz	35,230	36,665
Mene Grande	885,040	1,023,830
El Cubo	506,525	548,245
Cumarebo	66,170	78,335
Las Palmas	2,285	2,395
El Mene de Mauroa	20,335	22,590
Hombre Pintado	51,500	55,810
Quiriquire	1,519,110	1,219,955
Pedernales	145,885	165,540
Temblador	332,635	363,515
Oficina	1,444,095	1,492,490
Jusepin	280,535	403,605
Santa Ana	7,265	10,925
San Joaquin	112,255	118,200
El Roble	69,395	79,115
El Tigre	3,030	3,530
Guario	885	2,660
Socororo	4,630	1,135
El Mene de Acosta	155	.....
Los Caritos	1,360	6,240
Total	14,553,670	15,730,105

Mexico . .

NINETY per cent of Mexico's petroleum exports in September totaling 1,854,900 bbl., or approximately 1,626,800 bbl., went to the United States. The shipments from Mexico in September were down slightly from the total of 1,912,850 bbl. exported in August.

Remainder of the exports from Mexico in September consisted of two cargoes to Japan totaling 145,985 bbl., one shipment of asphalt to Australia of 22,075 bbl. and a 40,000-bbl. cargo of fuel oil to Cuba.

Italy . .

ALCOHOL is now a compulsory constituent of motor fuel in Italy. All gasoline sold from mineral-oil deposits (internal and customs deposits) must have an admixture of 20 per cent of alcohol. Exceptions are made for special and aviation gasoline, for which special withdrawal tickets are issued, gasoline for motor cars in transit, for export to the colonies and possessions, for reexportation, for use by the diplomatic corps, and for the army, marine, aviation, and state railway organizations.

C.N.G.A. 1940 FALL MEETING COMMITTEE

The recent annual fall meeting of the California Natural Gasoline Association, held in Los Angeles on November 1, was written into the record as one of the most heavily attended and most successful ever sponsored by the group. The committee in charge is shown here: Harry Fiske, Ingersoll-Rand Co.; H. E. Leedy, Crane Co.; W. W. Robinson, Jr., Texas Co.; L. V. Cassady, Lomita Gasoline Co.; George L. Tyler, secretary of the C.N.G.A.; John H. Kunkel, C.N.G.A. public-relations counsel; C. D. Gard, Union Oil Co.; M. W. Kibre, General Petroleum Corp.; J. B. Taylor, Signal Oil & Gas Co. (chairman); and W. C. Dayhuff, Standard Oil Co.

Natural Gas News

Lone Star May Acquire Assets of County Gas

WASHINGTON, D. C. — The Securities Exchange Commission has received applications under which Lone Star Gas Corp. proposes to acquire the assets of the County Gas Co., a wholly owned subsidiary, which subsequently would be dissolved. Most of the latter's assets, consisting of gas-distribution properties in and around Dallas, Tex., would be purchased by the Dallas Gas Co. through payment of $12,522 in cash, issuance of 10,470 shares of its common stock to Lone Star, and assumption of County Gas' liabilities applicable to the assets.

The remaining assets, consisting of gas-distribution properties in Dallas and Tarrant counties, would be acquired by Community Natural Gas Co., through payment of $125,000 in cash and assumption of liabilities applicable to the assets. The Dallas and Community companies likewise are subsidiaries of Lone Star.

Child Appointed Head Of A.G.A. Committee

NEW YORK.—Roland S. Child, personnel manager of the Central Hudson Gas & Electric Corp., Poughkeepsie, N. Y., has been appointed chairman of the committee on personnel practices of the American Gas Association by T. J. Strickler, president of the association. This committee is now in its fifth year as an association activity and is engaged in a continuing study of the industrial-relations problems of the gas industry.

Gas Line Is Completed In Pecos County, Texas

FORT WORTH, Tex.—Completion was recorded last week for a short 8-mile natural-gas line from the White & Baker field in Pecos County, West Texas, to the town of Bakersfield in eastern Pecos County. The line was from Cardinal Oil Co.'s lease in the field to the Bakersfield station where the gas will enter existing pipe lines and be taken to the Pecos Valley Power & Light Co. plant at Girvin and to the city of McCamey in Upton County, Texas.

Dow Chemical May Use Panhandle Field Gas

MIDLAND, Mich.—Negotiations between Dow Chemical Co. and Panhandle-Eastern Pipe Line Co. are being conducted in an attempt to develop a bigger natural-gas supply for Dow's Midland plant. The plan, it was reported, is predicated on Michigan Consolidated Gas Co.'s plan before the Securities Exchange Commission to purchase the Austin gas field for a reservoir for Texas-Kansas produced gas. Midland is approximately 125 miles northwest of the closest tie-in point on the present Panhandle-Eastern Michigan gas-transmission line.

The Midland plant now buys about 3,000,000 cu. ft. of stripped gas from the Temple field, Michigan, but could step its gas consumption up to 15 to 25 million cubic feet per day, if available at burner chemical-extraction rates. Panhandle-Eastern and affiliates supply the city of Detroit.

Gas Association Changes Names of Sections

NEW YORK.—By vote of its membership, the American Gas Association has adopted an amendment to its constitution changing the names of the commercial and industrial gas sections. Hereafter the former will be called the Residential Section and the latter has been named the Industrial and Commercial Gas Section. These changes were made so that the names would conform more accurately to the activities of these two sections. There has been no change in the scope of either section's activities.

Underground Storage of Gas Proposed in Michigan

WASHINGTON, D. C.—Various geologists testified November 7 and 8 at Washington before the Securities and Exchange Commission in support of the Michigan Consolidated Co.'s petition for permission to buy the Austin gas field in Mecosta County, Michigan. The company plans to use the field for storage and possibly build a pipe line to Detroit. The city of Detroit, Mich., intervened and indicated it would present witnesses in a week, to present the city's viewpoint, particularly from the gas-rate angle.

Panhandle Eastern Offers Large Bond Issue

NEW YORK.—A $22,500,000 refinancing project by Panhandle Eastern Pipe Line Co. has been announced. J. D. Greveling, president, said Monday Panhandle Eastern proposed to offer publicly $12,000,000 first-mortgage 3 per cent bonds, due 1960, and to sell privately to a group of insurance companies and banks $11,250,000 of first-mortgage bonds and serial notes. The proceeds, totaling $23,250,000 would be used to repay $22,500,000 outstanding 4 per cent bonds, redeemable at 102½ per cent of face value, plus accrued interest.

The pipe-line system extends from the Amarillo field in the Texas Panhandle and the Hugoton field of southwestern Kansas through Oklahoma, Kansas, Missouri and Illinois to Dana, Ind., and supplies natural gas to Detroit, among other communities.

Southwestern Gas Measurement Short Course April 15-17

At a meeting of the general committee of the Southwestern Gas Measurement Short Course held in Dallas, Tex., October 28, the dates of April 15, 16, and 17, 1941, were selected for holding the 1941 short course at the college of engineering, University of Oklahoma, Norman, Okla.

Refinery News

Texas Co. to Build Alkylation Unit at Los Angeles Plant

LOS ANGELES, Calif. — Manufacture of 100-octane aviation gasoline will be started next spring at the Los Angeles Harbor refinery of the Texas Co. (California) it was made known here last week. New equipment for producing the fuel will be installed at a cost of about $1,000,000 and the plant will be in operation by about March 1, according to Torrey H. Webb, vice president and general manager of the company. The plant will be of the alkylation type and will have a daily capacity of 13,600 gal. of base stock from which the aviation gasoline will be blended. Blueprints of the plant have been approved and construction is to be started immediately. The Los Angeles Harbor refinery of the company has a daily crude capacity of 37,000 bbl., with a cracking capacity of 10,000 bbl.

Roosevelt Places Cracking Units Back on Stream

MOUNT PLEASANT, Mich.—Roosevelt Oil Co. last week placed its 1,000-bbl. cracking unit back on stream after a shutdown of several weeks to repair damage caused by a fire. Straightrun units, having a daily capacity of 5,000 bbl., escaped serious damage and were returned to stream within 48 hours after the outbreak of the fire.

Reclaimed Oil Company Charged With Misrepresentation

WASHINGTON, D. C. — Westville Refinery, Inc., Westville, Ind., a distributor of reclaimed oil, has been charged with misrepresentation, in a Federal Trade Commission complaint.

Through use of the word "refinery" in its corporate name and in other ways, the respondent, according to the complaint, represents that it operates an oil refinery, when in truth the complaint alleges it does not own and operate such a refinery in the sense in which the term is understood in the petroleum industry and by the public, namely, to designate a place with the proper and usual equipment where virgin crude oil is refined and prepared for use. The respondent, according to the complaint, is engaged solely in reclaiming and processing used motor fuel oil from crankcase drainings.

The complaint alleges further that the respondent represents that its product is Pennsylvania oil with a paraffin base; that the base is wholly Pennsylvania oil, and that it is made solely from paraffin-base stock. According to the complaint, such representations appear in statements printed on labels attached to containers, and the respondent's use of the brand name "Para-Penn" in describing its motor oil constitutes within itself a representation that the oil is from the Pennsylvania oil field and has a paraffin base.

Dubbs double edge

The first refiner to install Dubbscracking in his territory gets the edge on his competitors in marketing as well as in manufacturing

Dubbscracked gasoline sets quality standards that motorists go for—that ordinary gasoline can't meet—there's the marketing advantage

And the refiner makes his Dubbscracked gasoline from any kind of oil—and at lowest cost—that's the manufacturing advantage

How can his competitors get even?

Why, by installing Dubbscracking too—and U. O. P. catalytic polymerization to make high octane polymer gasoline from the cracked gas

No wonder more and more refiners are installing both processes

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor

PROGRAMS AND MEETINGS

National Chemical Show in Chicago To Depict Progress of Industry

More than 20,000 are expected to attend the first biennial National Chemical Exposition and Industrial Chemical Conference at the Stevens Hotel, Chicago, which will be held December 11-15. The affairs will be under the auspices of the Chicago section of the American Chemical Society.

An educational and scientific exhibit, which will dramatize the progress of the chemical industry, will be a highlight of the exposition. The display is being assembled by Dr. C. Robert Moulton, formerly of the Museum of Science and Industry of Chicago and associated in an executive capacity with A Century of Progress.

Victor Conquest, program chairman, states that the conference and show will reveal the latest scientific information, new discoveries and developments in the science of chemistry and its application and progress in many fields of activity.

Technical sessions of the conference have been arranged for Thursday forenoon and evening, December 12; Friday forenoon and evening, December 13, and Saturday afternoon, December 14.

Accountants Will Meet November 22; Two Speakers Named

The Petroleum Accountants Society of Oklahoma will meet Friday, November 22, in the Ivory Room of the Mayo Hotel in Tulsa. Dinner will be served at 6 p.m. so that out-of-town members may start home at a reasonable hour.

A. M. Ritchie, superintendent of the Texas Co. research laboratories at Beacon, N. Y., will address the society on "Scientific Utilization of Our National Resources as It Relates to the Oil Industry." James O. Marberry, Jr., member of the legal department of Skelly Oil Co., will discuss the wage-hour bill, and the many important questions this bill has raised. Following the address, Mr. Marberry will answer questions and invite general discussion.

Illinois Oil Scouts Select Mount Vernon For Regular Meeting Place

The Illinois Basin Scouts Association met at the Hotel Emmerson in Mount Vernon, November 12, this being the first meeting since the organization of the association 3 years ago. The scouts decided that weekly meetings would be held in Mount Vernon until further notice.

Officers of the association are W. B. DeMarrs, Texas Co., president; Virgil Richardson, Carter Oil Co., vice president, and C. O. McMullen, Shell Oil Co., Inc., secretary-treasurer.

Mississippi Geological Society Will Make Field Trip

The Mississippi Geological Society will conduct a field trip in Northwest Alabama on December 6, 7, and 8. This organization, which is composed of oil-company and state and federal geologists located in Mississippi and the adjoining states, expects to have a large number of visiting geologists to join them on the field trip.

The leaders of the trip are to be Dr. R. S. Poor, head of the department of geology at Birmingham-Southern College, and Arthur Blair, chief geologist of the Tennessee Coal & Iron Co. The committee in charge of arranging the trip is comprised of Joe Dawson, chairman; K. K. Spooner, Willard Payne, R. M. Harris, and W. B. Sinclair, all geologists of Jackson, Miss.

The trip is to start at the Tutweiler Hotel in Birmingham, Ala., on the morning of Friday, December 6. A study will be made of the entire section of the Cambrian, Ordovician, Silurian, Devonian, the Mississippian, and Pennsylvanian formations southeast of Birmingham. Friday evening, the geologists will gather at the Tutweiler Hotel for dinner and entertainment. Saturday, a trip will be made from Birmingham north to Huntsville, Ala.

Saturday afternoon the geologic section at Monte Sano State Park will be visited. The group will spend Saturday night at the Russell Erskine Hotel in Huntsville. Sunday morning they will proceed down the Tennessee Valley. In addition to the outcrops, they will see the Wilson and Wheeler dams and Muscle Shoals. The party will disband Sunday noon in the vicinity of Sheffield, Ala.

Reservations for the trip can be made with D. C. Harrell, secretary-treasurer of the society, P. O. Box 1490, Jackson, Miss.

West Texas Oil and Gas Association Changes Meeting Date to December 2

ABILENE, Tex.—The 1940 annual meeting of the West-Central Texas Oil and Gas Association will be held in this city December 2.

Change of the time for this session, from the date originally announced, was made necessary, Joe A. Clarke, Albany, president of the oranization announced, because of a conflict with another program.

Feature of the day will be a banquet and entertainment program at Fair Park Supper Club at 6:30 p.m. This function will be open to both men and women, and officials of the association assert that it will be an outstanding affair. An address by a speaker of national prominence will highlight this session.

In the afternoon "open forum" at a downtown hotel, several problems of direct and immediate concern to those in or affected by the operations of the oil industry will be discussed by specialists on those subjects.

Since the West-Central Texas Oil and Gas Association led off last week in the movement for a new oil and gas commission—which effort has now been joined by four other regional organizations of the industry—it is expected that the forthcoming session will feature a spirited discussion on the merits of that proposal.

Advance registrations for the evening program and dinner can be made now through the Abilene office of the association, Mr. Clarke revealed. He urged that all who plan to attend get their tickets as early as possible so the local arrangements committees could better plan for caring for the crowd which is expected to be in excess of 700 people.

CALENDAR OF EVENTS

December

WEST CENTRAL TEXAS OIL AND GAS ASSOCIATION, annual meeting, Abilene, Tex., December 2.

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, New Orleans, La., December 2-6.

MID-CONTINENT OIL AND GAS ASSOCIATION, annual joint meeting of standing committee on state and local taxation, and standing committee on federal income and excise taxation, Hotel Tulsa, Tulsa, December 5-6.

AMERICAN PETROLEUM INSTITUTE, Illinois Basin chapter, Southern Gardens, Salem, Ill., December 6.

NATIONAL ASPHALT CONFERENCE, Adolphus Hotel, Dallas, Tex., December 9.

NATIONAL CHEMICAL EXPOSITION, Stevens Hotel, Chicago, December 11-15.

PETROLEUM ELECTRIC POWER ASSOCIATION, Heidelberg Hotel, Baton Rouge, La., December 12-13.

MID-CONTINENT OIL AND GAS ASSOCIATION, annual meeting of general board of directors, Tulsa Club Roof, Tulsa, Okla., December 16.

1941

January

SOCIETY OF AUTOMOTIVE ENGINEERS, annual meeting and engineering display, Book-Cadillac Hotel, Detroit, Mich., January 6-10.

LIQUEFIED PETROLEUM GAS ASSOCIATION eastern section, regional meeting, New York, January 16-17.

COMPRESSED GAS MANUFACTURED GAS ASSOCIATION, INC., annual meeting, New Nork, January 20-21.

NORTHWEST PETROLEUM ASSOCIATION, Radisson Hotel, Minneapolis, Minn., January 23-24.

February

NORTH TEXAS OIL AND GAS ASSOCIATION, Wichita Falls, Tex., February 22.

LIQUEFIED PETROLEUM GAS ASSOCIATION, INC., annual convention, Chicago, February 24-25.

AMERICAN PETROLEUM INSTITUTE, southwestern district regular spring meeting, Washington-Youree Hotel, Shreveport, La., February 27-28.

March

AMERICAN SOCIETY FOR TESTING MATERIALS, Hotel Mayflower, Washington, D. C., March 3-7.

AMERICAN PETROLEUM INSTITUTE, Pacific Coast District, Division of Production, regular spring meeting, Biltmore Hotel, Los Angeles, Calif., March 11.

April

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, twenty-sixth annual meeting, Rice Hotel, Houston, Tex., April 2, 3, and 4.

AMERICAN CHEMICAL SOCIETY, St. Louis, Mo., April 7-11.

SOUTHWESTERN GAS MEASUREMENT SHORT COURSE, College of Engineering, Oklahoma University, Norman, Okla., April 15-17.

AMERICAN PETROLEUM INSTITUTE, eastern district, Division of Production, regular spring meeting, William Penn Hotel, Pittsburgh, Pa., April 17-18.

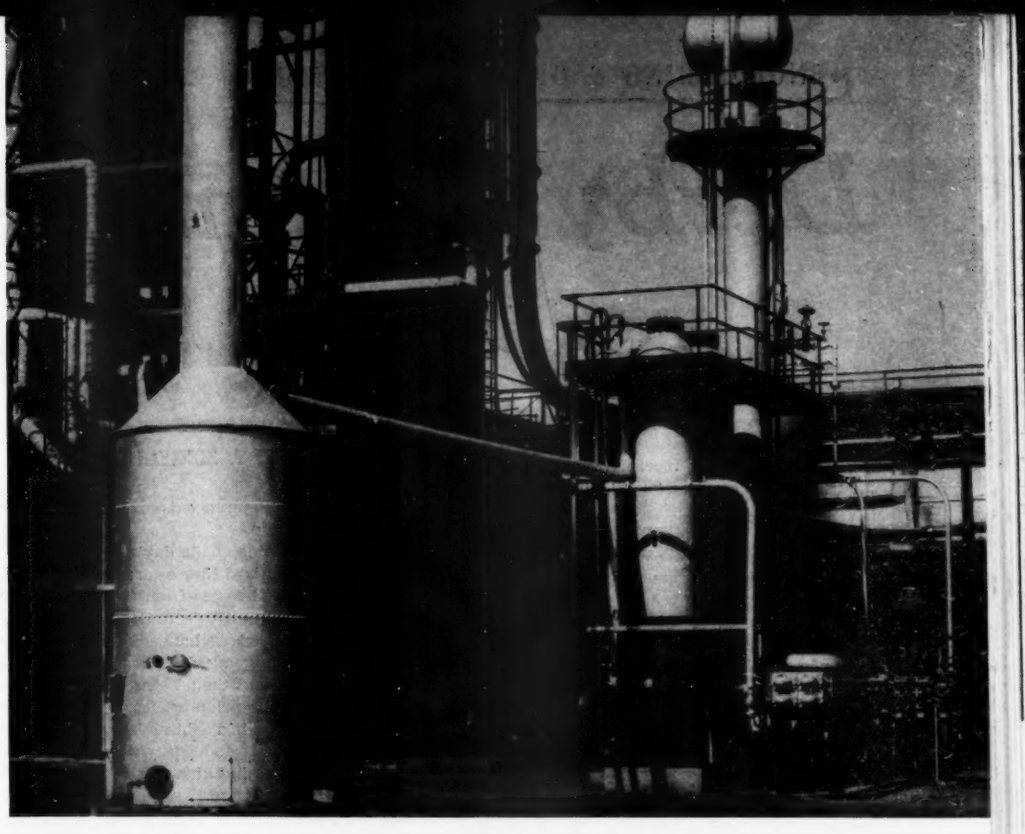
NATURAL GASOLINE ASSOCIATION OF AMERICA—Annual convention, Baker Hotel, Dallas, Tex., April 23-25.

PETROLEUM INDUSTRY ELECTRICAL ASSOCIATION, Mayo Hotel, Tulsa, April 23-25.

NATIONAL PETROLEUM ASSOCIATION, semi-annual meeting, Hotel Cleveland, Cleveland, Ohio, April 24-25.

September

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, Petroleum Division, East Texas chapter, annual convention, Adolphus Hotel, Dallas, Tex., September 25-27.



Polymerization, or its related processes, continues to be utilized in more and more refineries in the production of high-octane gasolines. The catalytic poly unit shown here was recently installed in a Kansas refinery as part of a modernization program. (A description of the work and the refinery's operation begins on Page 30.) The heater is in the left foreground and catalyst towers, exchangers, stabilizer and mercaptan absorber in right foreground

ENGINEERING & OPERATION

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Derby Streamlines Kansas Producing High-Octane

By W. T. ZIEGENHAIN

THE Derby Oil Co. recently completed a construction program at its Wichita, Kans., refinery, to streamline the manufacture of high-octane motor fuels and tractor distillates so as to best meet the demands of the Middle West.

The plant had undergone two similar modernization programs in its 20 years' history to date, and the one just completed was designed to utilize the previous improvements to best advantage. The manner in which these earlier improvements have been modified to fit into the newer scheme of processing is of special interest to refiners who are faced with similar modernization problems.

The equipment added during the latest modernization program includes a U.O.P. catalytic polymerization plant capable of processing 1,500 M.c.f. of cracked gases daily, a stainless-steel-lined fractionating tower which handles the overhead from three cracking heaters, centrifugal hot-oil charging pumps and a Hoover gasoline treating unit and a Perco dry-process unit for straightrun gasoline.

Routine Procedure

The accompanying flow chart offers the most convenient means for determining the manner in which the equipment has been tied into the stream-lined operation. Reference is made to it in the following discussion.

In ordinary routine of the day's operation, 8,000 bbl. of 37-gravity mixed Kansas crudes are charged to the stills. This oil comes from fields in McPherson, Rice, Reno and Cowley counties. This oil passes through conventional exchangers where it picks up heat from the outgoing side streams of kerosene, distillate, gas oil, and then it passes through one bank of coils in the primary heater. The heated crude is then flashed in a debutanizer and from this a 5 per cent cut of 86 to 88-gravity material is recovered. After passing through additional heat exchangers, a cut of 10 to 12 per cent 360-end-point gasoline of 57-octane number is recovered also. The remaining heated crude is flashed into the primary fractionating tower where a 13 to 16 per cent cut of 52-octane-number straightrun gasoline is recovered.

As side streams off the primary tower, the company recovers a cut of 3 to 7 per cent high-initial, low-end-point naphtha, a cut of 7 to 13 per cent high-gravity kerosene, another of 38-gravity distillate representing a yield of 4 to 8 per cent depending upon the kerosene produced and a light gas oil or furnace oil. The bottoms from this primary tower are returned to the heater through roof tubes and are flashed in a vacuum tower. Here a distillate is recovered as overhead and a side stream of light gas oil is taken off also. The bottoms are continuously removed as a 7 to 11 per cent cut of asphalt.

The vacuum distillate approximates 40 per cent of the charge to the unit. This distillate is the charging stock for the Dubbs cracking plant which in turn supplies the gases for the new polymerization unit.

Cracking Unit

The Dubbs cracking unit is conventional in its operation, however, advantage is taken of the fact the company had three good heaters left over from the consolidation of cracking operations formerly carried out in three units. Unusual flexibility is thus provided in splitting and heating the stream coming from the bottom of the fractionating tower for recycle.

The residuum from the cracking unit is a 300-viscosity fuel oil approximating 27 per cent of the gas-oil charge. It has a b.s. content of not more than 0.4 per cent and is at least 99.6 per cent soluble in carbon tetrachloride.

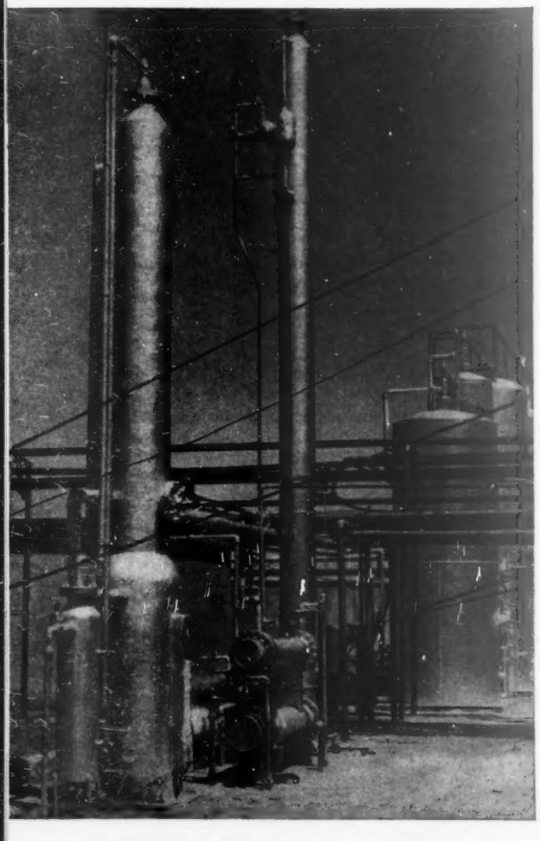
Cracked gasoline plus the cracked gases leave the top of the tower at about 200 lb. pressure and pass through a condenser and receiver from which the high-pressure or permanent gases are recovered as fuel. The liquid from the bottoms of the receiver flows into a stabilizer tower which is maintained at 50-lb. pressure.

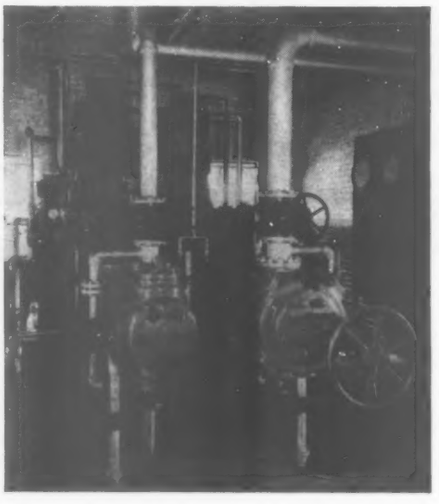
Polymerization Plant

The bottoms off the stabilizer represent the bulk of the cracked gasoline production. This is a 5 to 6-v.p. product which is processed through the new Hoover copper chloride treater and then sent to finished storage for shipment as such or for blending.

Under the reduced pressure all undesirable light fractions are removed from the cracked gasoline

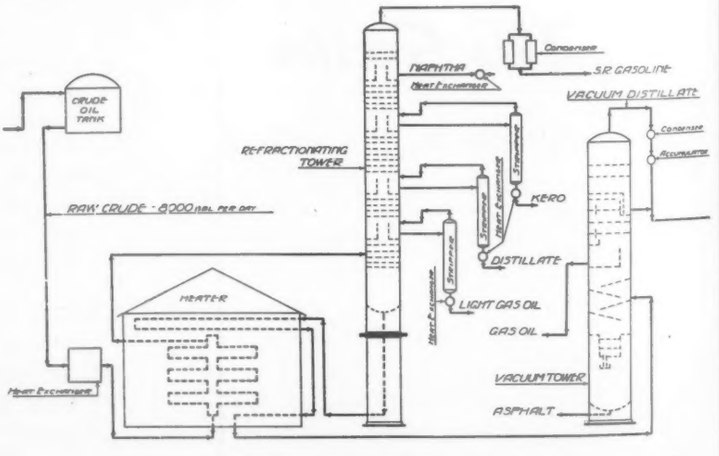
Below: New Perco treating unit handling up to 3,000 bbl. of straightrun gasoline per day. In rear is new Hoover treater which handles all cracked gasoline





Above: Compressor handling up to 1,500 M.c.f. cracked gases daily. Operates as charging pump for new polymerization unit. Also recovers light gasoline from cracked gases

Right: Simplified flow chart showing streamlined production of high-octane number motor fuels and tractor distillates at the Wichita, Kans., refinery of the Derby Oil Co.



Plant for Gasoline

and these serve as charging stock for the polymerization plant. The manner in which these gases are handled is of particular interest.

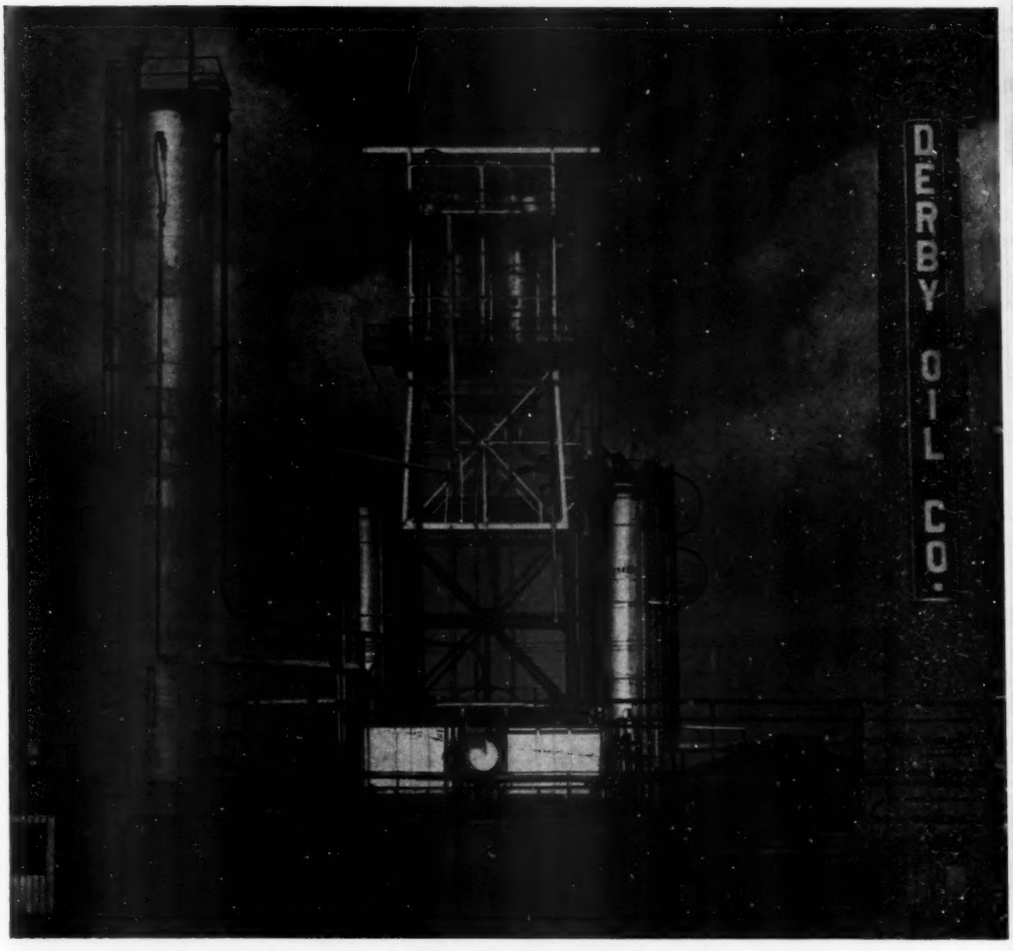
Instead of processing these gases through the conventional absorption unit, they are compressed in a 200-hp. two-stage angle-type unit. In the first stage they are compressed to 130 lb. pressure and then pass to the other side where they are boosted to 500 lb. pressure. The conventional intermediate drips and exchangers are provided and the quantity of material recovered from these approximating 2,500 gal. per day.

The overhead or the uncondensed gases from the compression gasoline stabiliber serving this unit are drawn into the second stage at about 125 lb. pressure and are compressed to 500 lb. At this pressure and at a temperature of about 225° F. they enter the heating coil of the polymerization furnace.

The charge of gases going to the heater daily will approximate 1,100 M.c.f. and in the heater it is brought to a temperature of 400° F. The heated gases enter the first of the two catalyst towers at 385° F. and after passing down through it they pick up heat due to the exothemric reactions which take place here during the conversion. Leaving the base of the first tower the gases enter the top of the second tower at 435° F. and pass down through the second to leave the latter at 460° F.

Stabilizing and Treating

Permanent gases and the products of the polymerization towers than pass through a vapor exchanger where they are cooled. From here they are charged into a conventional stabilizer. Uncondensed gases leave the top as plant fuel while the stabilized polymer liquid is continuously withdrawn at the base at about 285° F. temperature and at 250 lb. pressure. This liquid is further cooled and is treated in a mercaptan absorption tower. A continuous chemical treatment finishes the polymer gasoline to a mercaptan content of less than 3 per cent and as the product leaves the unit it has a vapor pressure of about 22 lb., an end point of 420 and a gravity of 68° to 70°. It has a direct octane number of 85 and a blending value of 110-octane number.



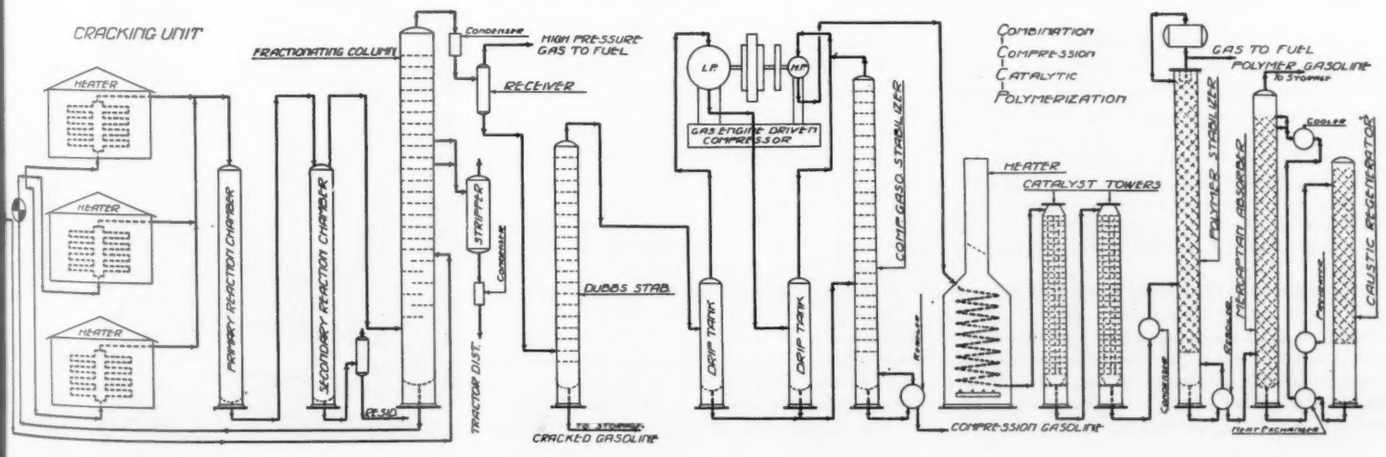
Revamped cracking units showing new stainless-steel-lined tower at left

This material serves as blending stock to meet a wide range of octane requirements and together with the normal production of other grades of gasoline, brings the total yield of gasoline to 55 per cent.

Twentieth Anniversary

This year the Derby Oil Co. is celebrating its twentieth anniversary and the modernized plant presents a markedly different picture than the 1,000-bbl. skimming plant offered when it was purchased by A. L. Derby in June, 1920. Then the essential equipment consisted only of seven shell stills, four condenser boxes, a combination pump house and receiving house and the customary rundown tanks and storage tanks. At that time the refinery was purchased by Derby from S. P. Wallingford, who was primarily interested in grain and was operating a Wichita elevator. However, Mr. Wallingford did not entirely divorce his interest in the refinery for he now is a vice president of the refining company and remains on the board of directors.

The operations of the company, and particularly those of the refinery, have been consistently keyed to the needs of an agricultural community. Therefore, the company has featured the manufacture of tractor fuels of several grades. A major part of the recent changes in equipment and operations were designed to provide increasing production of these fuels and to supply the flexibility of plant operations needed to change specifications.



2,600 Ft. of Cemented Tubing Removed From Coastal Well

By NEIL WILLIAMS

A FISHING job involving the cutting out of a long string of tubing cemented in the hole recently was accomplished in a deep wildcat drilled by McCarthy Drilling Co. in the Bailey's Prairie area, Brazoria County, Texas Gulf Coast. Since then, the test (1 Munson) has been in process of completion as a producing well from 11,860-ft. sand to open the deepest production so far established in the upper Texas Gulf Coast district.

The tubing was cemented in the hole from about 5,700 ft. to below approximately 8,300 ft., with solid, hard cement from 6,300 ft. to below 8,100 ft. The job was particularly difficult as the 5½-in. (o.d.) casing, having an inside diameter of 4.778 in., afforded very little clearance between the 2-in. tubing, on which were 3⅛-in. collars, for cutting and washing down around the string.

For any operator, cleaning of this deep hole was regarded as next to impossible, but rather than sacrifice the 11,860-ft. hole, in which a full string of casing had been run after potentially productive sands had been found, it was decided to attempt the project. Due to there being a string of 9⅝-in. casing behind the 5½-in. casing down to 6,628 ft., well below the top of the cement, it was considered unfeasible to attempt to mill out and sidetrack.

Cementing of the tubing string occurred during an attempted multiple-stage squeeze job through perforated casing at 11,372 ft. Hole had been drilled to the total depth of 11,860 ft. and 5½-in. casing set and cemented at 11,841 ft. Up to that time no trouble of any kind had been experienced. In making the squeeze job the first two batches of cement, each consisting of 100 sacks, were pumped out into the formation successfully. The first batch was placed at a pressure of 3,500 lb., and the second batch at 4,500 lb. An additional 200 sacks of cement was mixed, and of this 75 sacks were pumped out with the pressure on the pumps building up to 6,500 lb. However, at this point, the pressure suddenly dropped to around 1,000 lb.

On the assumption that the formation had started taking the cement more readily or that the cement had found outlet behind the casing, the remaining 125 sacks of cement were pumped in. In this the pressure on the pumps built up to 1,800 lb., where it held.

Cause of Failure

What actually happened has not been definitely determined, and operators are of the opinion the modified cement retainer gave way when pressure built up to 6,500 lb., allowing the cement to bypass up the hole behind the tubing. As possible indication of their theory, they point out that when the retainer was encountered in fishing operations, the last 300 to 400 ft. of the tubing string, on which the retainer was run, was found badly buckled and bent.

The first step in the fishing job was to pull that part of the tubing string above the top of the cement. As it was not known how high the cement was, a series of inside cuts were made at approximately 1,000-foot intervals, up the hole, starting about 200 ft. off bottom, until the tubing was found free, which was at approximately 5,700 ft. The free section then was pulled. With this done, the job called for washing down over the outside of the tubing through the cement, and then cutting out, with inside cutting tool, as long sections as possible as the hole was washed down.

For washing down over the 2-in. tubing, 4-in. flush-joint pipe was used. This was run on 2⅞-in. drill pipe. A rotary shoe was run on the bottom of the 4-in. pipe to cut the cement. In the first 600 to 700 ft., down to about 6,300 ft., the cement, which there had not set up so good, was soft, and the tubing was washed over without great difficulty, and then cut and pulled. Very hard cement then was encountered, and from then on, the job became slow and tedious.

In the hard cement, trouble was experienced with the rotary shoes splitting up. Sometimes, large pieces and strips would be left 6 to 8 ft. up in the hole. On one occasion, a slab 13 in. long and

3 in. wide broke off and was lost in the hole. Frequently not more than a few feet could be made until the shoe started to split, making it unusable. The longest section of tubing washed over in any one trip through the hard cement, was between 300 and 400 ft. long.

Best results and longest service were obtained with the use of a three-tooth shoe, with teeth about ½ in. long. After the first few trips this type shoe was run exclusively.

After washing down over the tubing until the shoe began to break up, the wash-pipe string would be pulled, and an overshot run on 2-in. tubing to tie onto the top of the fish. With this string hung in the slips, an inside cutting tool would be run in on 1⅝-in. drill pipe, and an inside cut would be made, usually about 2 to 3 ft. below the top of the hard cement. This much hard cement generally was not enough to prevent pulling the cut section.

After pulling each section, in turn, a Cavins vacuum bailer with a junk basket was run to clean out the broken cement and other junk down to the top of the hard cement. This was the deepest hole in which such a bailer ever had been used. However, the large slab of shoe previously mentioned as having broken off on one trip had to be fished out. For this it was necessary to make a special die box, having threads on the inside. This was run in on the bailer, and fortunately, on the first run the die box wedged onto the slab and brought it out.

Procedure Followed

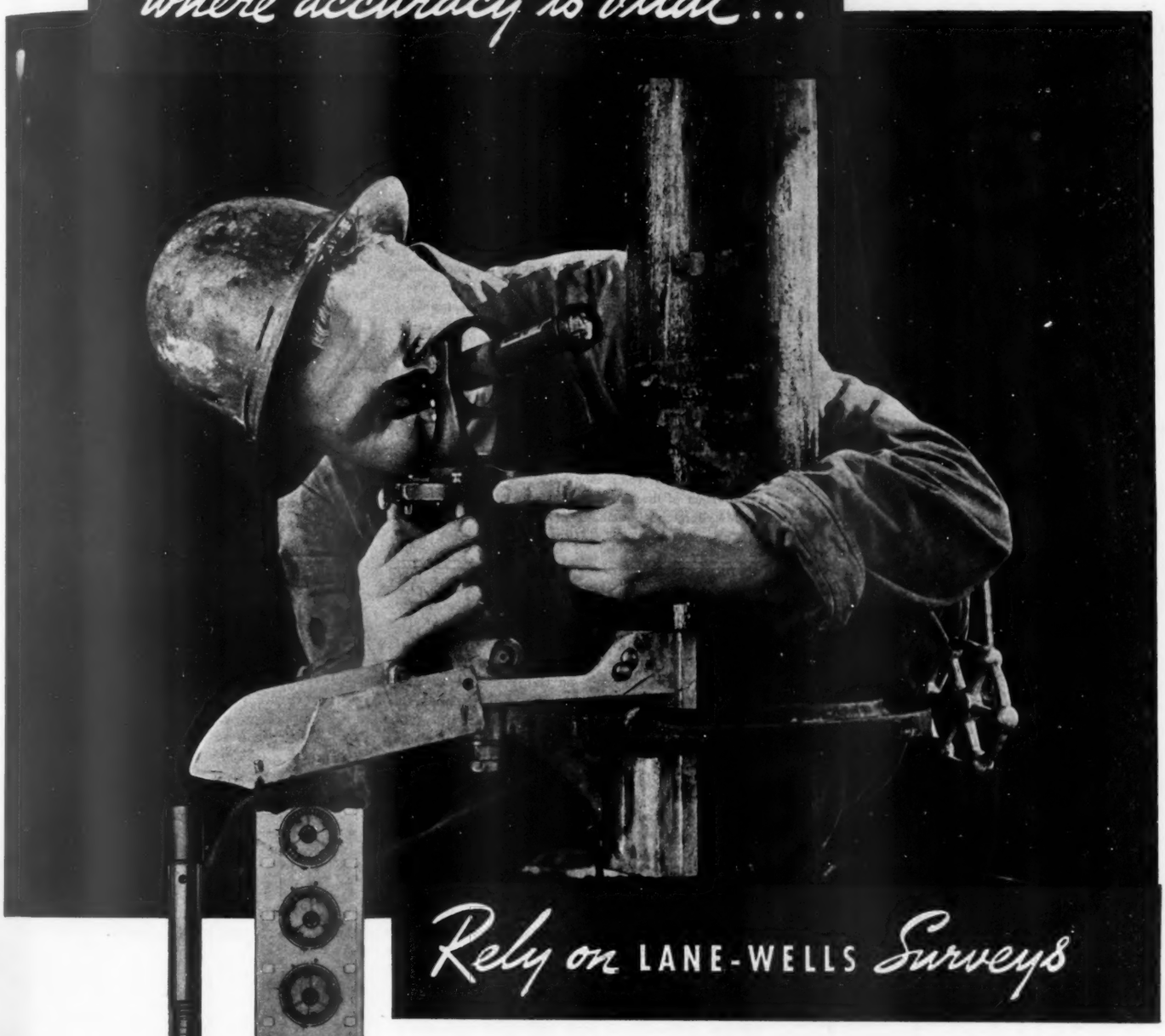
With the hole cleaned of broken cement and junk down to the hard cement, the 4-in. wash pipe, with rotary shoe on bottom, would be run in again to wash over another section. This procedure then was repeated until the entire string of tubing was cut out.

On one cut, the cement, however, was so hard around the bottom of the cut section that the fish could not be pulled. This necessitated going

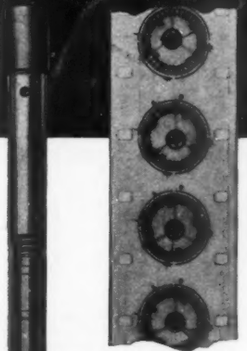
(Continued on Page 49)

Left: Glenn H. McCarthy, president of McCarthy Drilling Co. at the 1 Munson in Brazoria County, Texas Gulf Coast. Below: General view of the deep wildcat in Bailey's Prairie area, Brazoria County, in which operators successfully recovered a string of tubing cemented in the hole. The well now is being completed as the discovery producer of a new field, and as the deepest producer in the Upper Texas Gulf Coast district

where accuracy is vital...



Rely on LANE-WELLS *Surveys*



Lane-Wells Multiple Shot Surveys record inclination and direction of either cased or open hole

Lane-Wells Single Shot readings can be taken during drilling, either on drill pipe or on sand line.

(LEFT) *Lane-Wells Single Shot Photo-Record Magnetic Survey Instrument is rented to operators in the United States and Canada and sold for export use.*

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Multiple-Phase Hydrocarbon Systems

By D. J. VINK,* A. M. AMES, R. A. DAVID, and D. L. KATZ
University of Michigan, Ann Arbor

ABSTRACT

The behavior of three fluid-phase hydrocarbon systems and the precipitation of asphaltic substances are discussed. Experiments demonstrating these phenomena with mixtures of crude oils, solvents and natural gas are reported. A three-phase system at 99° F. and 1,410 lb. was analyzed for the gaseous constituents and the equilibrium constants between the gas and each liquid were calculated. The equilibrium data indicated the gas-liquid relations to be similar to two-phase systems.

This paper was presented before the Petroleum Division of the American Institute of Mining and Metallurgical Engineers at its fall meeting in Tulsa, October 24-26, 1940.

THE principles of two-phase equilibria in hydrocarbon systems are being unfolded by the many studies in this field.[8 12] The results of such investigations have been very fruitful in the solving of the problems arising in the production of crude oil, natural gas and natural gasoline. During the development of two-phase knowledge, the third phase has sometimes appeared.[6 16] This appearance and the observation that certain well effluents will separate into three phases indicate that our knowledge of the behavior of natural gas and crude-oil systems will not be complete until multiple-phase systems have been investigated.

A background for multiple-phase hydrocarbon behavior may be gleaned from such work as Kalichevsky[3] giving the principles of deasphaltizing and refining of lubricants, the classical relationships of immiscible liquids and early reports of high-pressure systems containing a gas and two immiscible liquids.[17] This paper discusses these phenomena as applied to hydrocarbon systems. Experimental data on the behavior of a mixture

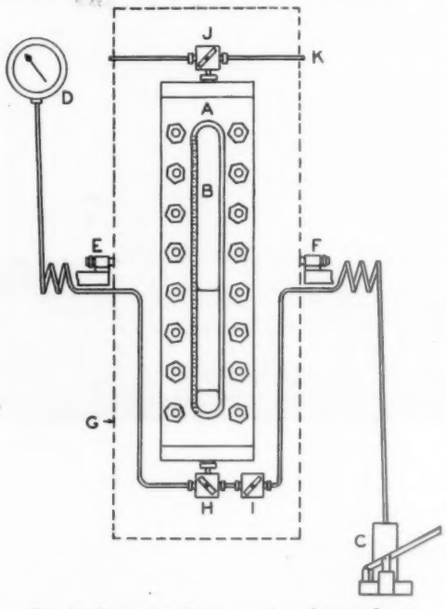


Fig. 1—Apparatus for measuring phase volumes

of crude oil, propane, and natural gas are presented. One three-phase system was analyzed to give two equilibrium constants each for the constituents methane and propane.

Background

Everyone is aware of the fact that liquid water and hydrocarbons such as gasoline are immiscible. This separation of polar and nonpolar substances into two liquids is the basis for the separations in the three-phase system of natural gas, crude oil, and water. In cases where the temperatures are relatively low, such systems are considered as a crude oil-natural gas system with the gas phase containing a partial pressure of water vapor and the water insoluble in the crude oil. At high pressures this partial pressure exceeds the vapor pressure of pure liquid water, but the mutual solubilities of the two liquids are normally neglected. Turning from the systems where immiscibility is due to distinctly dissimilar substances, it is found that immiscible liquids are formed from hydrocarbon systems alone[3] in the refining of lubricating oils.

The phase separations occurring in the refining of lubricants involve volatile solvents such as propane and asphaltic substances which are present in crude oils. Asphaltic substances vary in nature from tiny colloidal particles insoluble in all organic solvents to high molecular weight resinous compounds soluble in petroleum solvents. These colloidal particles are believed to be graphitic carbon[20 21] from X-ray studies. The resins are believed to be compounds containing oxygen, sulfur or nitrogen and upon oxidation in several stages become colloidal particles. The presence of oxygen permits the resins to become polar and these compounds are believed to stabilize the colloidal particles by absorption to the graphitic nucleus. Complete removal of the resins from the systems should precipitate the asphaltic particles. Partial removal may cause precipitation of the particles but agitation of the particles in the presence of the resins may return deposited particles back to a uniform colloidal suspension. This colloidal phenomenon and the differences in the properties of volatile solvents and high molecular weight compounds in the absence of intermediate blending materials are the bases for the immiscibilities occurring in the condensed phases of hydrocarbon systems.

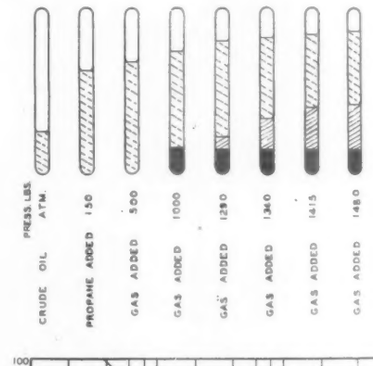
Early work by Van der Waals[17] showed that the system ethanol-ethane would divide into three phases under a certain condition of pressure and temperature.[5] This insolubility can be attributed to the differences in the properties of an alcohol and a hydrocarbon.

Experimental work reported on the fractionation of reduced crude oils[1 2 9 12] by means of propane, butane, and natural gas illustrates the three-phase systems composed of petroleum hydrocarbons. These investigations apparently were directed towards methods of fractionating lubricating oils at low temperatures. They show that the addition of methane increases the precipitating ability of propane and butane solution for asphaltic constituents and that it causes solutions of crude oils and volatile solvents to separate into two liquid phases. Similar experiments have substantiated the precipitating ability of volatile solvents and dissolved natural gas.[16 17]

From this background further work was done both at atmospheric pressure and at high pressures to investigate the phase behavior of crude oils under conditions where three hydrocarbon phases are at equilibrium.

Apparatus and Methods

All experiments at atmospheric pressure were conducted in graduated glass cylinders. Those systems requiring pressure were brought to equilibrium in a glass-windowed cell similar to the one described.[7] Fig. 1 shows the essential parts of the apparatus with the exception of the steel plate front to the air bath which has observation



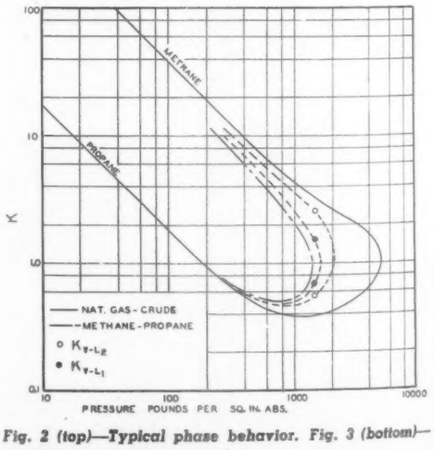


Fig. 2 (top)—Typical phase behavior. Fig. 3 (bottom)—Equilibrium constants at 99° F.

*Standard Oil Co. of California Fellow 1939-1940.

slits covered with double safety glass for protection against possible shattering of the glass window.

The atmospheric pressure separations were made by mixing the solvent and crude oil in the glass cylinders and allowing the solution to stand either at room temperature or in a refrigerated box. Pressure experiments were conducted by drawing crude oil by means of an aspirator into the evacuated cell through Valve 1 (Fig. 1) after disconnecting the pump. Solvent was forced through line *K* into the cell. Agitation to reach equilibrium was accomplished by rocking the cell around axis *EF*. Natural gas was also added through line *K* followed by agitation before making observations. Mercury was injected only when displacing equilibrium layers of fluid from the cell as it forms emulsions with the asphaltic constituents upon agitation. Upon precipitation, asphaltic constituents often would adhere to the glass window, making visibility very difficult.

TABLE 1—SEPARATION OF MIXTURES OF SOLVENT AND THE 24.4° A.P.I. CRUDE OIL

Run No.	Vol. % pentane	Vol. % asphaltic or lower layer	Temp., °F.
1	80	43	23
2	90	32	23
3	96	14	23
8	75	50	23
9	80	44	23
10	90	38	23
11	66	no separation	23
..	10-90	no separation	80-90°F.
	% Hexane		
5	90	6	23
6	96	5	23
7	98	5.5	23
12	85	16	23
..	..	no separation	80-90°F.
	% Propane		
..	Greater than 50	slow separation	80-90°F.

A 24.4° A.P.I. crude oil, previously described,* was diluted with various amounts of hexane, pentane, and propane, the latter in the equilibrium pressure cell. Table 1 gives the data observed when allowing solutions of the crude oil and solvent, after agitating, to settle for 24 hours or longer. At room temperature pentane and hexane in varying amounts appeared to be completely miscible with the crude oil and no sedimentation of the asphaltic particles was observed. Upon lowering the settling temperature to 23° F. two liquid phases appeared as indicated. After removal of the upper liquid layer, the solvent was allowed to evaporate from the asphaltic layer. Those yields of asphaltic substances which were small gave a brittle black solid after the evaporation, while the residues from the higher yields were viscous tars. These results are in accord with the theory that the first asphaltic material to be separated is the colloidal particles with further precipitation including the high molecular weight resinous compounds.

Increased precipitation appears to go gradually from asphaltic particles to liquid resinous compounds. The asphaltic constituents remain as part of the second phase with no separation between particles and resins.

The experiments in the glass-windowed cell with several propane ratios indicated the precipitation to be slow at room temperature. Natural gas was always added and so the effect of propane alone over periods of time was not carefully observed. Sludges were formed with propane and the 24.4° A.P.I. crude, as well as with two other crudes studied in much the same manner as with pentane and hexane. This sludge included the asphaltic particles excepting that which may have adhered to the windows or walls of the cell. The addition of natural gas caused the asphaltic material to separate into a cake or plastic mass of smaller volume than the sludge. The behavior of crude oil-solvent mixtures when natural gas was added will now be described.

TABLE 2—BEHAVIOR OF 24.4° A.P.I. CRUDE, PROPANE, AND NATURAL GAS

Run No.	Volumes cc. Crude	Volumes cc. Propane	Pressure lb./sq.in.ga.	Temp., °F.	Gas	Volumes of phases, cc. Light liq.	Heavy liq.	Plastic solid
3	25	25	1,350	Room	0	65	25*	..
4	22	25	1,550	Room	30	14	46*	..
5	20	29	1,060	Room	30	51	0	9
12	22	35	1,310	Room	2	66	13	9
13	21	19	1,200	Room	43	35	0	12
			2,010	Room	44	24	0	12
14	22	37	1,290	Room	16	56	6	12
15	22	30	760	Room	26	51	0	13
			1,560	Room	4	44	29	13
1*b*	25	25	1,165	76	47	0	30	13
			2,540	229	54	0	36*	..
9*b*	15	29	600	Room	47	48	0	5
			900	Room	Heavy liquid appears			
			1,350	Room	38	32	15	5
			1,600	Room	0	49	26	5
			Vented from top cell and added gas					
			1,725	Room	66	0	19	5
			2,460	Room	72	0	13	5
		Vented to	1,200 lb. propane injected					
			1,200	Room	37	43	5	5
			1,430	....	44	22	19	5
10b	19.7	26.3	1,395	99	28	30	32	..

*Includes plastic solid.

TABLE 3—BEHAVIOR OF MISCELLANEOUS CRUDES, SOLVENTS, NATURAL GAS

Run No.	Volumes cc. Crude	Volumes cc. Propane	Pressure lb./sq.in.ga.	Temp., °F.	Gas	Volumes of phases, cc. Light liq.	Heavy liq.	Plastic solid
24.4° A.P.I. with Pentane								
3*b*	14	34	1,805	107	25	55	0	11.0
			2,085	111	20	59	0	11.0
			2,585	105	4	71	15	....
			2,400	78	14	63	*13	....
			2,590	110	4	71	*15	....
24.4° A.P.I. Crude with Hexane								
9*a*	10	32	1,670	81	27	63	Flocculation begins	
			2,390	87	29	†61	....	....
10*a*	25	26	2,890	90	22	‡68	....	....
11*a*	15	21	1,830	205	44	46	Flocculation begins	
			2,750	200	Asphalt on cell window and appears to form cake			
32.6° A.P.I. Crude with Hexane								
7*a*	13	28	1,780	77	40	50	Flocculation begins	
			2,930	85	31	59	Asphalt adheres to cell window; solution clear	
32.6° A.P.I. Crude with Propane								
8*a*	15	26	185	82	51	39	Asphalt in cake	
			1,305	86	21	63	§6	....
			1,565	91	5	70	§15	....
California 33.5° A.P.I. Crude Kcl 11-11 with Solvents								
6*b*	14	12	150	85	Tar settled out			
7*b*	14	27	140	83	Tar settled out			
		(propane)	1,100	71	53	*37	....	....
			1,820	79	62	*28	....	....
1*a*	16	12	840	94	60	*30	Flocculation begins	
		(pentane)	2,680	94	58	*32	Liquid clear red	
2*a*	13	25	230	93	52	*38	Slight flocculation	
		(hexane)	1,070	95	47	*43	More flocculation	
			2,030	96	40	*50	Asphalt in cake	
			2,910	97	33	*57	Liquid clear	

*Includes plastic solid or flocculated particles. †Includes layer of precipitated asphalt. ‡Sludge settled in ½ hour. §Difficult to classify as liquid or asphalt.

Solutions of Crude Oil, Solvent, and Natural Gas

The largest number of experimental measurements were made with the 24.4° A.P.I. Kansas crude oil, propane, and natural gas, analyzing nitrogen 0.6 per cent, methane 86.4 per cent, ethane 6.5 per cent, propane 3.6 per cent, butanes and heavier 2.9 per cent. This crude oil when blended with an equal or greater volume of propane was easily deasphaltized with the addition of natural gas. Prior to adding gas, the slowly precipitating asphalt could be resuspended. However, after practically complete removal of the particles with gas in solution at pressures up to 600 or 800 lb., the deposited plastic mass could not be resuspended in the hydrocarbon solution.

Fig. 2 is a scale drawing of the amounts of the phases appearing in the cell window in a typical experiment (No. 14) using the 24.4° A.P.I. crude* and a volume of propane greater than the crude oil. The precipitated plastic phase adheres to the bottom of the cell and is not made miscible with the heavy liquid by rocking of the cell to give agitation. This asphaltic phase may not allow the entire system to be in equilibrium. However, the upper three phases are in equilibrium as evidenced by reproducibility of results and recession of both liquid phases if the gas phase were vented from 1,480 lb. If the plastic mass were in equilibrium with the heavy liquid, the continuity between the precipitation of asphaltic particles and the liquid resinous compounds appears to be broken.

The flocculation occurring at 500 lb. upon waiting would have produced a sludge including some liquid hydrocarbons, but solution of gas to a pressure of 1,000 lb. causes the asphalt particles to form a cake independent of the presence or absence of a second liquid phase. Table 2 gives results for the 24.4° A.P.I. Mid-Continent crude mixed with propane in varying amounts and saturated with natural gas to the indicated pressures.

A summary of some other experiments with a 33.5° A.P.I. California crude and at 32.6° A.P.I.* Arkansas crude in addition to the 24.4° A.P.I. crude are given in Table 3. Because the work was exploratory, a large number of runs with nonconclusive results were made. Table 4 gives data on a reduced crude, propane, and natural gas. It shows that increasing the gas in solution caused a second liquid phase to appear and grow in volume. Gas pressure rise from 1,350 to 1,450 lb. caused the meniscus between the gas and light liquid to disappear probably by reaching a bubble point. Venting some of the top phase caused reformation of the second liquid and addition of gas caused it to disappear. The shrinking of the liquid upon increasing the gas pressure from 1,550 to 2,110 lb. indicated the system as a whole was above its critical temperature. Also the gas-light liquid system passed from below its critical temperature to above its critical temperature by the change in composition occurring while venting and injecting gas.

Vapor-Liquid-Liquid Equilibria

The four-phase system previously described was made up as follows: 19.7 cc. of the 24.4° A.P.I. crude oil and 26.3 cc. of liquid propane were

TABLE 4—CRITICAL PHENOMENA BETWEEN GAS AND LIGHT LIQUID
(17.3 cc. Porter (Michigan) reduced crude oil, 25 cc. propane, natural gas)

(lb./sq. in. ga.)	(°F.)	Volumes phases, cc. Gas	Light liq.	Heavy liq.	Remarks
850	66	44.0	....	46.0	Gas added
1,030	66	42.0	8.6	39.4	No separate solid
1,200	66	38.1	18.2	33.7	Gas added
1,350	66	33.0	25.3	31.7	Gas added
1,450	66	....	60.0	30.0	Meniscus disappeared
1,442	66	33.3	26.3	30.4	Vented top phase
1,550	62	....	60.9	29.1	Gas added
2,110	62	....	63.6	26.4	Gas added
1,580	62	....	61.3	28.7	Vented top phase
1,445	62	....	59.4	30.6	Vented top phase
1,415	62	56.7	2.1	31.2	Vented top phase
1,360	62	54.1	4.0	31.9	Vented top phase

placed in the glass-windowed cell. Natural gas was injected and the asphaltic particles settled to a sludge. Addition of gas to about 1,100 lb. pressure caused a second liquid phase to separate from the deasphaltized solution. More gas was added to bring the system to equilibrium at 99° F. and 1,410 lb. per sq. in. absolute. At these conditions the volumetric proportions were 28 cc. gas, 30 cc. low-density liquid, 32 cc. high-density liquid and a small amount of plastic solid asphalt.

After considerable agitation and waiting of several hours with further mixing of the phases, samples of the three fluid phases were taken by mercury displacement. A sample container was attached to the top of the cell and mercury was pumped into the bottom to keep the pressure constant while the gas phase was displaced into the container. As the meniscus reached the top of the glass window, the gas sample container was removed and a small amount of the fluid at the interface was discarded. The two liquids were transferred in like manner.

The three fluids were analyzed for the gaseous constituents in a low-temperature fractionating column with the results given in Table 5. Butanes were not determined in the liquids because of the negligible quantity in the vapor and the small samples available.

The fourth phase of plastic solid was not analyzed in this case. On a similar experiment[7] the asphalt and included gases were blown out of the bottom of the cell onto a cardboard. It did not flow upon standing at room temperature. The molecular weight of this solid was 979 while that of the original crude oil was 345 as determined by the effect on the freezing point of benzene.

Equilibrium Constants of the Three-Fluid Phase System

Equilibrium constants of a constituent are defined as the ratio of the molal concentration in the vapor to the concentration in the liquid for a system at equilibrium at a given temperature and pressure. The presence of two liquids gives two values of the constant for each constituent between the vapor and the two liquids as well as a ratio of the concentrations of a constituent in the two liquid phases. Table 6 gives the values of these constants for methane, ethane, and propane in the system natural gas-propane-crude oil.

Fig. 3 is a plot of methane and propane equilibrium constants at 99° F. for these constituents in the methane-propane system,[15] in the natural gas-crude oil system[4] and for the three-phase system. The constants for methane and propane are for any mixture of methane and propane which has two phases at 99° F., but the pressure of convergence to unity is the critical pressure for the methane-propane mixture which has a critical temperature of 99° F.[5,6] Likewise the convergence pressure to unity for the natural gas-crude oil system may be the critical pressure for a system that has a critical temperature of 99° F.

Curves symmetrical to the known constants through the values from the three-phase system indicate a possible behavior of the phases. The gas-light liquid curve indicates that the system composed of the ratio of these constituents which

TABLE 5—ANALYSIS OF THREE FLUID PHASES IN EQUILIBRIUM AT 99° F. AND 1,410 LB. ABS.

Constituent—	Gas	Light liq. mol fractions	Heavy liq.
Methane	.650	.432	.256
Ethane	.024	.026	.034
Propane	.326	.467	.583
Residue	.00	.075	.127
Mol wt. residue	...	226.0	295.0
Sp. gravity residue	...	.851	.883

TABLE 6—EQUILIBRIUM CONSTANTS IN A THREE-PHASE SYSTEM AT 99° F. AND 1,410 LB. ABS.

	K_{v-l_1}*	K_{v-l_2}†	K_{l-l_2}‡
Methane	1.51	2.54	1.69
Ethane	0.91	0.71	0.78
Propane	0.70	0.56	0.80
Crude residue	...	...	0.59

*Vapor-light liquid. †Vapor-heavy liquid. ‡Light-liquid-heavy liquid.

has a critical temperature of 99° F. also has a critical pressure of about 1,560 lb. in keeping with the data of Table 4. Likewise the gas-heavy liquid curve indicates a critical pressure around 2,100 lb. for the correct ratio of these two phases.

The behavior of the systems in the equilibrium cell, although changing with pressure by gas injection, bears out the existence of a critical phenomenon between the gas and light liquid at pressures in the range indicated by the curve. As the critical pressure is approached the light liquid evidently would lose most of the constituents heavier than propane as evidenced by the decrease in color intensity and slight increase in critical pressure of this system over methane and propane alone. At the approach to the critical, the constants between the light liquid-heavy liquid must approach the gas-heavy liquid values. The injection of the light liquid into the system gas-heavy liquid may change the course of these constants with pressure from that indicated in Fig. 3 as the critical pressure of the gas-light liquid system is exceeded.

Discussion of Results

Three interrelated problems have been touched upon; the precipitation of asphaltic particles, the conditions for formation of a second liquid phase and the vapor-liquid-liquid equilibrium.

The ability of volatile hydrocarbons and dissolved natural gas to precipitate asphalt is in accord with reports in the literature. The experimental observations indicate that the precipitation does not necessarily include the liquid resinous compounds to form a second liquid. If no natural gas is present, the asphalt appears to flocculate and settle, but can be resuspended in the oil. However, natural gas with increasing pressure causes the asphalt to deposit as a cake in cases which did not form a second liquid, or at several hundred pounds pressure below the appearance of a second true liquid phase. If the asphalt were not deposited before the second liquid were formed, it is possible that it would enter the heavy liquid phase. The relatively small difference in the compositions in the two liquid phases analyzed indicates, however, that neither phase would retain the asphaltic particles and that they are likely to be irreversibly precipitated.

The conditions for formation of a second liquid phase are the proper concentrations of dissimilar substances. It should be noted that all experiments had a high concentration of a solvent considerably different from the crude oil. If the crude contained some of the gasoline-range constituents to form a rather continuous change in composition, no second liquid could be formed although the asphalt could be flocculated. The volatile hydrocarbon solvent and dissolved natural gas evidently reaches a composition which will not dissolve the high molecular weight or resinous compounds and so the phase divides with an equilibrium distribution of all constituents in the two liquids. The 24.4° A.P.I. crude required an equal volume of propane or more to allow the second liquid to form. At lower concentrations the injection of gas caused the liquid phase to decrease as if it were approaching a dew point. It should be noted that in Table 4 the second liquid formed was the light (color and lower density) liquid while in Fig. 2 the heavy liquid appeared to form. Sufficient data were not always available to know which classification should be used in Tables 2 and 3 when only one liquid was present. A thorough study using small increments of pressure is required to clarify this behavior. Data of this nature would likely show a smooth curve of pressure versus concentration of solvent at the formation of a second liquid phase.

The lower molecular-weight solvents and the higher concentrations were favorable for the appearance of the second liquid phase at low pressures probably because of the increased solubility of gas and greater differences between the solvent and the high molecular weight constituents.

Once the three fluid phases are present, the concentration distribution appears to follow the well established laws of vapor-liquid equilibria. The two values for the equilibrium constants raise the question, to which liquid phase have previous constants been applying? Since the second liquid was not found below 900 lb. per sq. in. and since it is known that a knowledge of the composition of the system is necessary to predict the equilibrium constants to be used,[5,6] at these pressures the constants for the gas phase and each liquid in turn would be predicted by the proper consideration of the system involved in the same manner as for a gas and a single liquid. The behavior of three-phase fluid systems probably will be little more complicated than two-phase systems once the conditions for the formation of a second liquid are known.

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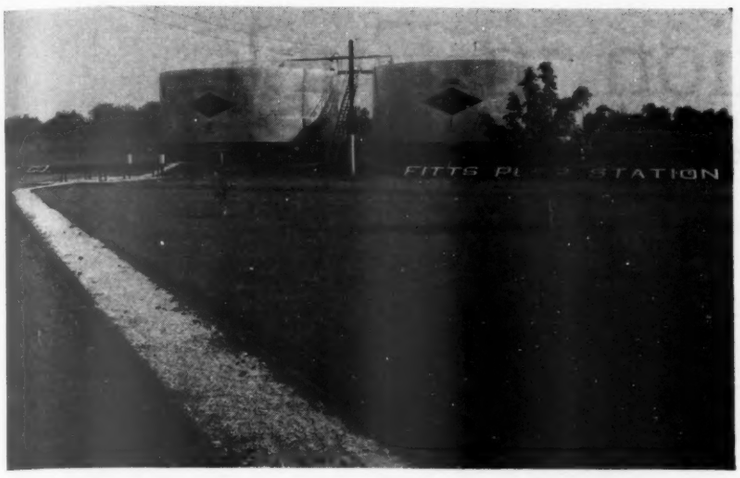
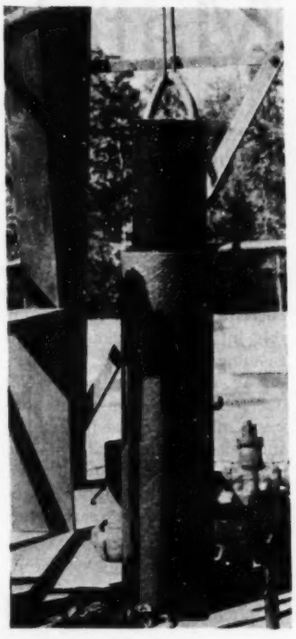
Operating Ideas



Pipe Guard for Walk Trench

Walkways at pump stations are necessary for safety and convenience. Some operators use board walks while others use chat or gravel to make a mud-free path. Where chat is used, some method must be employed to prevent its spreading over the grass surrounding the walk; this generally accomplished by placing boards on edge along the walk. One pipe-line company in the Fitts, Oklahoma, field uses old 3-in. pipe for this purpose. The pipe is easier to install and is much more durable.

Guide for Tong Counterweight



In place of the customary wire line running through the derrick floor to the counterweight suspended below, one drilling company uses a short section of drill collar, suspended within a sleeve of 8-in. pipe set into the floor and serving as guard and guide for the weight. This method of balancing the tong removes the small and all but invisible wire from the floor, substituting an object big enough to be seen and sturdy enough to withstand blow from any equipment which may chance to strike it. By beveling the top of the guide pipe, the counterweight may be greased or otherwise lubricated without the edge serving to scrape off the lubricant onto the floor.

Tiedown for Drilling Engine

Elimination of the vibration of the drilling engine is necessary for satisfactory service and reduction in the number of breakdowns. With the old slow-speed engines, a single tiedown on the back of the engine was sufficient, but with the introduction of substructures, the anchoring must be more elaborate. The accompanying photograph shows one method used by a Mid-Continent contractor. A 2-ft. thick concrete foundation for the substructure has a joint of 6-in. drill pipe buried in the center parallel to the engine bed. In addition there are two other pipes buried in the concrete, both perpendicular to first pipe; one is located midway and the other is at the derrick end of the concrete slab. C-links placed around these pipes provide anchoring points for the 12 turnbuckles. Instead of using drilling line with the turnbuckles, most contractors use old chain because it does not stretch.

Mud Boat Used for Tank Base

One Illinois contractor uses a mud boat for the transporting of pipe and connections kept with the rig. The boat can be pulled into the location by tractor during wet weather and in dry weather it can be loaded on a truck. After it is on the location, it serves as a foundation for the water-storage tank. This gives sufficient elevation to deliver the water to the pits and floor.

Trends in Automobile Design Match Evolution in Fuels

By T. A. BOYD and W. G. LOVELL
Research Laboratories Division, General Motors Corp.

A.P.I.—Presented before annual meeting, Chicago, Ill., November 11-15, 1940

THERE are four trends in automobile design which have been sustained for many years —trends toward: Greater comfort and better appearance; lower cost, both in purchase price and in operating expense; higher power; and more miles per gallon.

These four trends, and in particular the last two, are influenced by changes in the gasolines currently sold in filling stations. In respect to this influence, it should be mentioned that it is gasoline, not the car, that sets the pace. That is to say, the car does not lead the gasoline trend, but follows it. Cars must not get ahead of the trend in gasoline, for it would be folly to build an automobile engine that could not run well on the gasolines currently sold. The car designer has to bear in mind also that, although a new model may be introduced every year, nevertheless, a car once made has an average life of 8 years or more,[1] and it must run on gasolines available over that period.

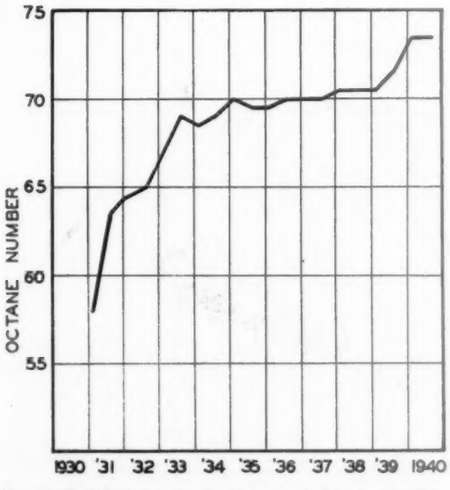
If the automobile trends toward higher performance and more miles per gallon are to continue, it is necessary: First, to get more and more charge of air and fuel into a cylinder of given size; and, second, to use the charge there to better and better advantage. To crowd more charge into the cylinders, either mixture temperature must be lowered or the pressure drop in the induction system must be reduced, while keeping at the same time good distribution; or a positive pressure may be applied by means of a supercharger.

This demands a volatile gasoline, of course, but one which is not so volatile as to bring on disturbances such as vapor lock. To use the charge to best advantage, mixtures must be as lean as permissible, and thermodynamic efficiency must be as high as possible. The latter can be accomplished only through high-compression ratios—and this, of course, demands gasolines that are as knock-free as possible.

The foregoing introduction is an outline in brief of the discussion to follow, which consists chiefly in presenting more definite information on the trends mentioned, and on how closely they have followed changes in the characteristics of the gasolines currently sold.

Changes in Gasoline

The upward trend in octane number for regular-price motor gasolines during the period 1931 to 1940 is shown in Fig. 1. As may be seen, the increase has been from below 60 to about 75 (A.S.T.M. values since 1933). In Fig. 2 are shown changes in volatility, as measured by distillation temperatures at representative points. On the average, the decrease in distillation temperature, or the improvement in volatility, during the 10-year period amounts to more than 25° F. at the 50 per cent point, and to from 10° to 20° at other points. The values given in Figs. 1 and 2 are all for regular-price motor gasolines, as sold by the eight or nine major distributors in Detroit, Mich.



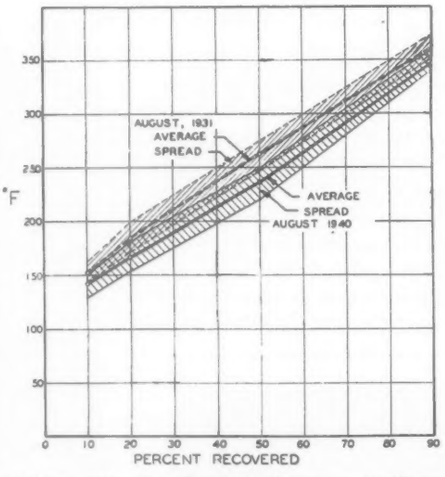
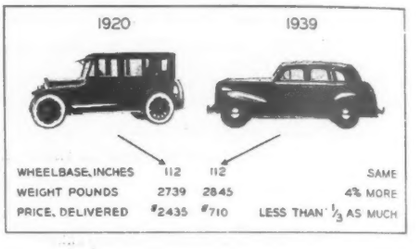


Fig. 1—Trend of octane number, regular-price gasoline in Detroit, Mich. Fig. 2 (right)—Change in distillation characteristics, regular-price gasoline in Detroit, Mich.

Comfort and Appearance

The first trend in automobile design mentioned at the outset, that toward more comfort and better appearance, is one of the most important of all, because these factors loom so large in the satisfaction of users. And the plentiful supply of gasoline at low cost, which always has been available, has exerted a major influence both upon comfort and appearance. This it has done by making it practical to build cars of large size and high performance. The higher cost of gasoline in Europe is an important one of the factors which have caused automobiles there to be smaller in size and lower in performance than those made on this side of the Atlantic.

The trend toward more volatile and more nearly knock-free gasolines also has influenced comfort and appearance, chiefly through the contributions to smooth and trouble-free engine operation. Another respect in which gasoline has influenced appearance is in such compromises in external lines as have been made to avoid trouble from vapor lock. And such compromises have been made, even though in the petroleum industry it has been thought sometimes that automobile makers have not gone far enough in this regard.



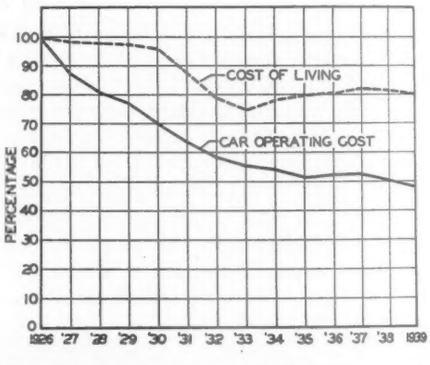


Fig. 3 (top)—Car buyer now gets three times as much for his money as in 1920. Fig. 4 (bottom)—Trend of car-operating cost

Cost

The second trend, that toward reducing the cost of owning and operating cars, has been a particularly pronounced one. The reduction in purchase price has been so large, in fact, that today the car buyer gets three times as much for his dollar as he did in 1920. As is shown in Fig. 3, a representative four-door sedan of 112-in. wheel base, which weighed 2,739 lb., retailed in 1920 for $2,435. In 1939 a representative car of comparable size, one having the same wheel base of 112 in. and weighing 2,845 lb.—4 per cent more—retailed at less than $735. Thus the 1939 car did not cost quite a third as much as the car of equivalent

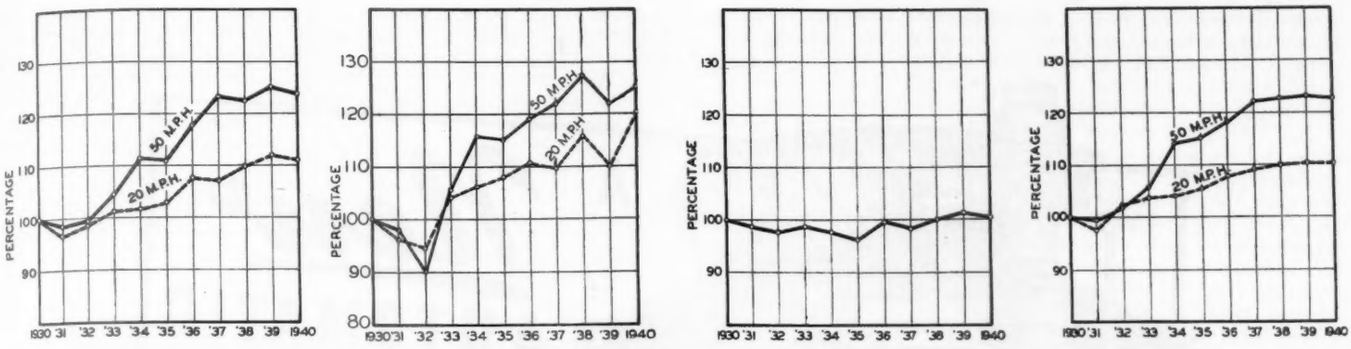


Fig. 5—Trend of performance factor, brake mean effective pressure times cubic-feet displacement per ton-mile. Fig. 6 (left center)—Trend of economy factor, ton-miles per gallon. Fig. 7 (right center)—Trend of engine size, cubic feet of engine displacement per ton-mile. Fig. 8 (right)—Engine power, brake mean effective pressure at full throttle

size and weight in 1920.* This tremendous reduction in the cost of cars is, of course, in addition to the further benefit which the car buyer receives today in the way of a more comfortable, more beautiful, and more satisfactory automobile.

That there also has been a downward trend in cost of operation since 1926 is shown graphically in Fig. 4. There it is seen that the direct cost of operating a car is only about half what it was in 1926. Cost of living, from the figures of the Bureau of Labor Statistics for 32 large cities, however, has decreased during the same period only 20 per cent. The data on car-operating cost, from the Automobile Manufacturers Association, are direct operating costs for light passenger cars, based on records of 10 large fleets.[2] These data do not include such fixed or indirect operating costs as depreciation, insurance, and garaging; but they do include gasoline, oil, tires, and repairs. . . .

Performance

The third major trend in automobile design is that towards more power. This is a trend of engineering design that also can be evaluated in definite figures. To make such an evaluation in as concrete terms as possible, for convenience we have taken as a basis a period of 10 years and six makes of cars that have been in high production for this period, and have expressed the trends in terms of averages for these six cars. Such a selection is somewhat arbitrary, to be sure, but the data have been dealt with so as to keep them as comparable as possible over this period.

In order to evaluate the trend, we have taken the performance factor as brake mean effective pressure times cubic feet displacement per ton-mile. This factor becomes comparable between different cars because it includes an adjustment for car weight and engine displacement. It is a measure of the relative amount of power that the driver has at his command to propel the car. In other words, it is what the driver may sense as the performance of the engineering package which he has purchased under the name of an automobile. As shown in Fig. 5, the trend in performance has been definitely upwards, and over the 10-year period an increase of about 25 per cent has been achieved at 50 m.p.h. and more than 10 per cent at 20 m.p.h. (see also, for comparison, Fig. 8).

Economy

Accompanying such a very considerable increase in performance, there has been no sacrifice in fuel economy—but, on the contrary, a considerable gain. A graphical representation of this trend is shown in Fig. 6, in which the percentage changes in the economy factor are plotted for speeds of both 50 and 20 m.p.h. This economy factor is taken as ton-miles per gallon, and over the 10-year period it shows an upward trend amounting to 25 per cent at the higher speed, and to 20 per cent at the lower speed.

It may be emphasized again that this gain in economy has been achieved at the same time that performance has gone up, although it is often thought that at any one time increased economy may be had only with a sacrifice of performance, or vice versa. That these two trends towards more economy and performance have been manifested simultaneously is due to the engineering advances which have been made to match a simultaneous evolution of fuels, chiefly in octane number and in volatility.

Engineering Trend

The purchaser of an automobile might be said to be interested in performance and economy, without regard to the manner in which they have been achieved. But in considering these trends from the standpoint of the utilization of the fuels which to a large extent have made them possible, it is necessary to consider the design trends that are responsible for the final product. The problem of getting more performance and economy has been answered in part by putting more fuel into the same size engine, and in part by using it to better advantage.

The engine size itself has not been changed appreciably. Relative engine size, for the purpose of indicating trends, may be taken as cubic feet of engine displacement per ton-mile. As is shown graphically in Fig. 7, the variation in this factor over this 10-year period has not been more than 4 per cent up or down. The engines thus have not changed in relative size; therefore, as far as getting performance from cars is concerned, this must mean that more is being gotten out of them.

That there has been a trend towards getting more power out of a given size of engine is indicated by the data in Fig. 8. These data, on the average brake mean effective pressures developed by this series of engines, show a fairly consistent increase, which over the 10-year period amounted to nearly 25 per cent at 50 m.p.h. and to 10 per cent at 20 m.p.h.

This increase in available power has come from a number of sources. One source has been an increase in compression ratio, made possible by better fuels and improved combustion-chamber design. This boost in compression has increased thermodynamic efficiency, and thus has yielded

*The 1939 car is used here for comparison, because later cars in the low-price field have wheel bases longer than 112 in. and weights considerably higher. But, aside from the increase in size, the comparison made in Fig. 3 would hold also for the 1941 car. The comparison given is based on a more extensive analysis made by the Automobile Manufacturers Association and published in the booklet, Men, Methods, and Machines in Automobile Manufacturing (1939).

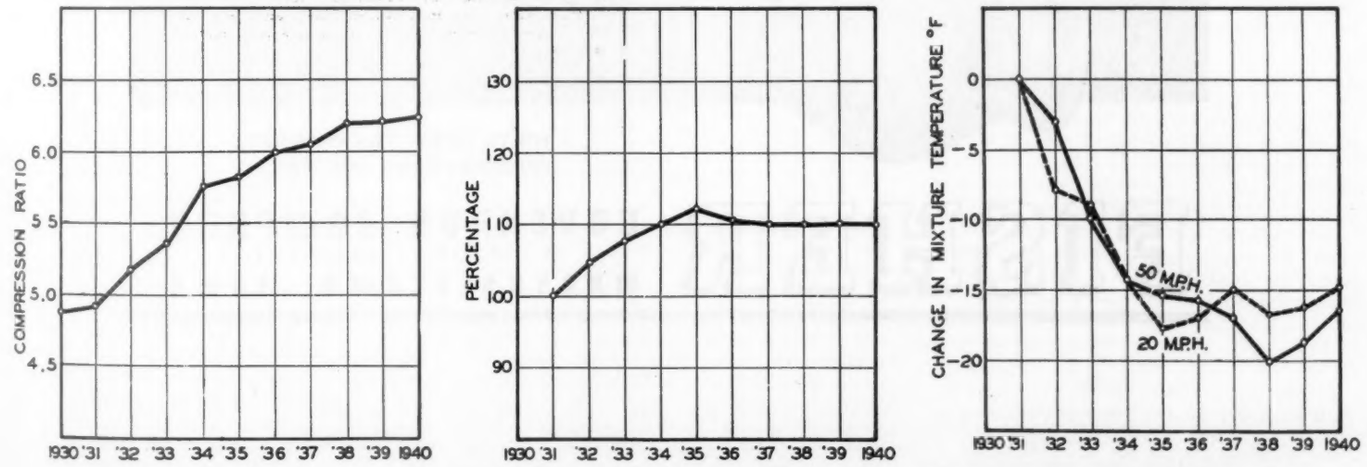


Fig. 9—Trend of compression ratio. Fig. 10 (center)—Trend of volumetric efficiency at 50 m.p.h. Fig. 11 (right)—Trend of mixture temperature, full load

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more power per unit of displacement. Although compression ratio of itself is not necessarily a reliable index of knock, nor of efficiency unless other factors are held constant, the trend in compression ratios is still of interest. Fig. 9 represents the trend in the average of compression ratios over the 10-year period, and shows the average increasing from 4.7 to about 6.25. This trend represents but one aspect of getting more energy out of the fuel which is put into the engine, or of getting more power out of the same size engine, due to an increase in efficiency.

Another way to get more power out of an engine is to put a larger charge of fuel and air into it, or to make an engine that will breathe better. Doing this offers not only the advantage of higher power, but also of better economy when other adjustments are made. The trend of engine breathing is shown graphically in the chart of relative volumetric efficiency, Fig. 10. This reveals an increase of about 10 per cent in volumetric efficiency at 50 m.p.h. over the 10-year period. In other words, about 10 per cent more fuel-air mixture goes into the engine.

This comes about not only from improvements in the induction system resulting in less restriction to the flow of air, but also from the use of cooler mixtures of fuel and air. The increase in mixture temperature above that of the air entering the carburetor may be taken as an index of mixture temperatures. The trend of this index is shown in Fig. 11, which indicates a reduction of 15° to 20° F. in the mixture temperature over the 10-year period under discussion. That it is possible to use cooler mixtures and to have induction systems with less restrictions is due in part to the improvement in the volatility of gasolines; and as a result the modern engine utilizes not only its fuel, but also its own materials of construction, to better advantage.

Another aspect of the better utilization of fuels by engines is the trend towards the use of leaner mixture ratios in automobiles over a period of years. The advantage of the use of lean mixtures is that it results in better gasoline economy, because less fuel is wasted or sent out the tail pipe as unburned carbon monoxide and hydrogen in the exhaust gas. It also has the accompanying advantage of reducing the possible hazard from carbon monoxide in the exhaust gas.

Data on this trend are not available year by year on the six automobile makes already considered. However, data are available from a paper yet to be published, in which surveys of mixture ratios were made in comparable and representative groups of cars in the years 1927, 1933, and 1940. Such data, in terms of mixture ratio over the speed range at road load, are shown in Fig. 12. Greater improvements have been made at high speeds than at low, but in general the cars of the 1940 survey were operating with mixtures about 2 ratios leaner than those of 1927. This improvement of 2 ratios, which corresponds to a saving in fuel of about 17 per cent, contributes largely to the gains in miles per gallon (Fig. 6).

This improvement in mixture ratio has been made possible primarily by advances in carburetor and induction systems, with resultant improvement in fuel distribution. And this has been possible in turn because of improvements in the volatility of gasolines. Only part of the resultant improvement has been taken directly as economy. Part of it was utilized for improving performance.

Viewed as a whole, the trends in engineering design, which have put more performance and economy into the automobile, seem to match the evolution in gasoline shown in Figs. 1 and 2. Thanks in part to more volatile gasolines, automobile engines are breathing more freely, and they also are breathing cooler air. Leaner fuel-air mixtures as well are being used. Furthermore, due in part to boosts in compression made possible by more nearly knock-free gasolines, the charge once in the engine is being used more efficiently. Thus all of these changes in engineering design not only have been correlated among themselves to produce a cheaper yet better final product, but they also have been matched with the evolution in fuels.

The Future

Still further advances can be made, for the end of what is possible has not yet been reached. This is true from a technical standpoint at least, and probably also from an economic one. As an indication of what can be done with fuels of higher octane number, there are presented in Fig.

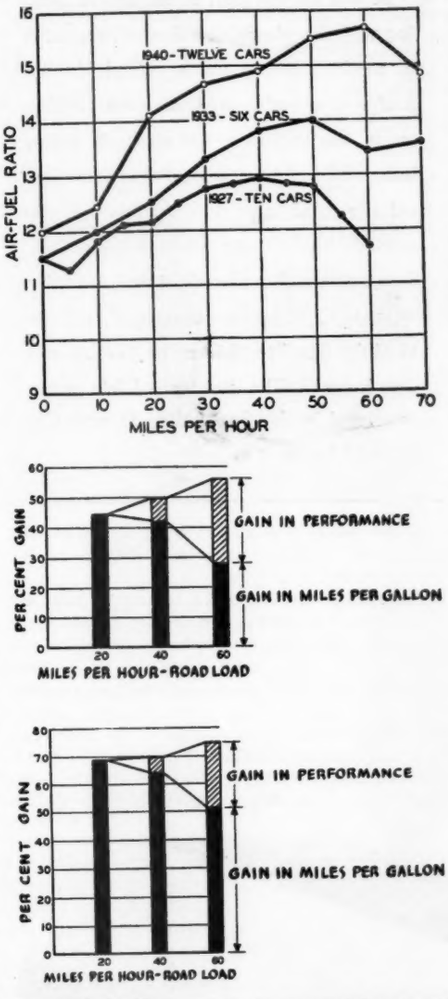

Fig. 12 (top)—Mixture ratios in representative groups of cars for various years, road load. Fig. 13 (center)—Gains with fuel of approximately 100-octane number compared with 70-octane number. Fig. 14 (bottom)—Gains with fuel of more than 100-octane number compared with 70-octane number

13 some experimental data obtained on a car in which a fuel of approximately 100 octane number was used instead of 70 octane number. When the 100-octane fuel was used, the compression ratio of the engine was increased as found possible for equivalent knock. This, of course, of itself would increase greatly the performance of the car; and in order to take the greater part of the gain of high compression as economy rather than performance, the axle ratio of the car was changed so as to maintain the original performance of the car at 20 to 30 m.p.h. The results, reduced somewhat the low speed from the data as obtained in order to show gains due to the change in octane number alone, are presented in Fig. 13. At 20 m.p.h., where the increase was altogether in miles per gallon, it amounted to more than 40 per cent. At the higher speeds the gain in miles per gallon was not quite so large. . . .

It may be of interest to present further, in Fig. 14, similar data for the same engine with the compression boosted to a ratio of 10.3:1, and with axle ratio further changed to give the original performance at 20 to 30 m.p.h. At this compression the fuel required was above 100-octane number; but the gains in miles per gallon were about 70 per cent at 20 m.p.h., about 65 per cent at 40 m.p.h., and about 50 per cent at 60 m.p.h. Here, as before, there was a residual gain in performance at the higher speeds. From these two items of direct experimental evidence it is apparent that, in spite of the sometimes expressed belief that nothing much can be gained by going higher in octane number, quite the contrary is true.

However, under some conditions, mechanical limitations may impose a barrier to the use of very high compression ratios. But even in such engines it appears possible, through the use of supercharging, to utilize high-octane fuels to advantage, and perhaps with gains in miles per gallon almost as large as those obtained by raising compression ratio. The practicability of supercharging automobile engines has not yet been fully explored, of course. Nevertheless, an attempt, based upon such limited experimental data as are available, has been made to estimate the gains in miles per gallon which a car with a supercharged engine using 100-octane gasoline would give, compared with an unsupercharged one of the same compression ratio using 70-octane gasoline. For this purpose two assumptions were made: First, that for the same performance engine displacement could be reduced by 45 per cent[4]; and, second, that the supercharger would be operative only in the case of power demands at a given speed above the output of the unsupercharged engine. At road loads the smaller engine thus would operate at a load factor distinctly higher than would the original engine, and that is how the gain would be made. For, on the basis of experimental data relating load factor and specific fuel consumption, which improves rapidly with load factor, it was estimated that the resulting increases in load factor would give gains in miles per gallon at road load varying from about 35 per cent at 20 m.p.h. to 20 per cent at 60 m.p.h.

The data presented above on what may be obtained with high-octane fuels may or may not indicate a future trend. However, they surely do show that, with still better fuels and with automobiles engineered to fit them, it is at least technically possible to make further improvements which will be as large or larger than those made in the past decade.

Conclusion

Thus the advances achieved year by year in fuels and in cars have been made to supplement one another in such a way as to give people better products, and at lower cost. The consistent growth and success of the oil and automobile industries indicate that car users have given these improvements their enthusiastic approval. And so it seems reasonable to expect that this mutual and advantageous evolution in fuels and engines will be continued as future technical and economic advances permit.

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Effects of Different Properties Of Rotary Drilling Fluids— Part 2

By HARRY F. SIMONS

In this second part of an article dealing with the effects of different properties of rotary drilling fluids, which is the fourth of a series dealing with drilling muds, the factors of gel strength, water loss, wall-building properties, thixotropy, salinity, alkalinity and acidity are discussed. In the first portion of the article, the qualities of mud weight and viscosity were dealt with. This appeared on Page 46 of the October 31 issue of The Oil and Gas Journal. The first two of this series appeared in the September 26 and October 10 issues

PLASTERING, or wall-building, quality of the mud is of primary importance as it controls the water lost from the mud into the formation. It is generally accepted that, with the exception of extremely porous formations, very little mud enters the formation, the main loss being water which has been forced through the filter cake on the wall of the hole.

Control of the wall-building property is what is generally sought when viscosity of the mud is increased. As pointed out in a previous article, viscosity is often a poor index of quality and performance of the mud, factors which cause the viscosity being more important. This is particularly true of the wall-building properties.

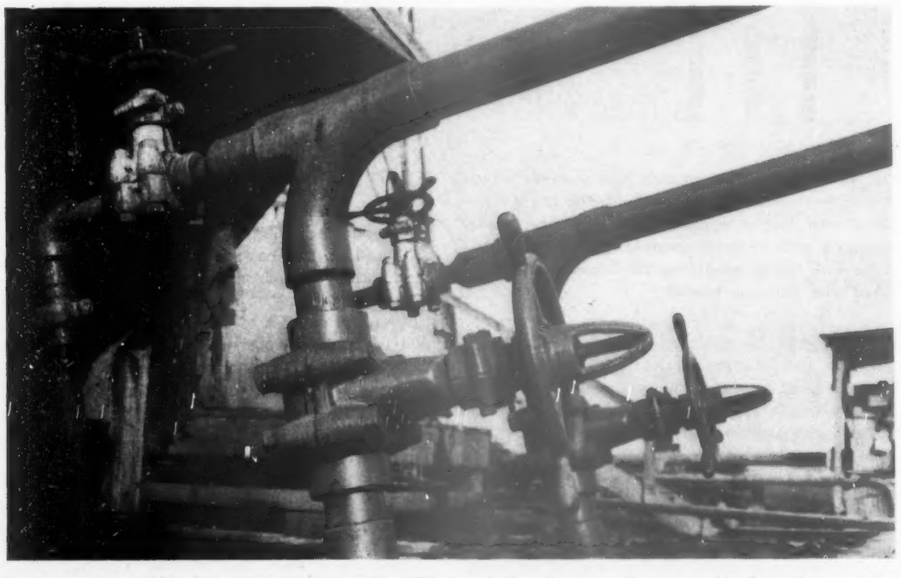
A flocculated mud will have an extremely high viscosity, so high in fact that the mud will not flow down the ditch. Yet it has very poor wall-building qualities due to the fact that larger clots, or coagulates, cannot form an impervious sheath on the wall of the hole. The flocculated mud may, and often does, build up a very thick filter cake on the walls of the hole and trouble may ensue.

Mud Sheath

A dispersed colloidal mixture will cause a thin impervious layer of mud to be deposited on the wall of the hole and will shut off the water from the formation. This is due mainly to the fact that water in the mud is absorbed on the outside of the clay particles and there is a firmer attachment between the water and smaller particles.[23]

That a mud having a high viscosity might have poor plastering qualities was indicated by Evans and Reid[24] who pointed out that a thin tenacious coating on the wall of the hole is produced by muds of moderate viscosity having a low water loss. The mud sheath may build up indefinitely with continued water loss if a poor mud is used, whereas with proper plastering qualities the sheath will reach a thickness of only ⅛ in. before water loss is stopped.

The sheath or filter cake cannot be built up without some water loss and as soon as the sheath becomes impervious to movement of water, the aggregation ceases. With muds having a high water loss, the sheath continues to be built up until it reaches a point where it can actually impede passage of the bit while making a trip. However, in actual practice rotation of drill pipe and passage of fluid containing a stream of particles bombarding the mud sheath prevent it from assuming any thickness like that which can be obtained in a filter press. If the filter cake becomes too thick, it may collapse from its own weight if the differential pressure between the mud column and the formation approaches zero or becomes negative. The formation is once more exposed to the mud and another mud sheath must be built up to protect it.



Part of mud manifold on rotary rig. Upper valves (2-in.) control mud guns and serve as bleeders. Larger valves are on line to derrick. The two 4-in. lines are connected together on the ground with an automatic switching valve

Heaving-Shale Problem

Drilling mud formerly was thickened to "make the hole stand up." The manner in which it does this is better understood since numerous investigations into the heaving-shale problem have been made. It was found that if water were prevented from entering the formation little trouble was experienced. The trouble was caused by the water swelling the shale particles until they expanded and some of the formation was shoved into the hole. The same effect may be noted on the surface by wetting a block of shale.

That the same effect takes place in ordinary shales is quite probable, and the difference of its effect from heaving shale is only a matter of degrees. Much trouble from sticking drill pipe could be avoided if water loss were kept at a minimum.

The misconception that the mud sheath or filter cake developed was dependent to some degree on the permeability of the formation has been disproved by Byck.[25] After testing a large number of natural and synthetic cores, it was seen that formation permeability was without appreciable effect upon the plastering properties of the mud. The permeability of the mud sheath is considered to be the most important factor in controlling the water loss into the formation.

This disproves the general conception of this phenomenon as in the past it was generally considered that formation permeability was a controlling factor. But the existence of this phenomenon is at least a partial explanation of the sticking of numerous strings of drill pipe which generally takes place opposite a formation having a fairly low permeability. The presence of a filter cake of too great a thickness opposite the sand results in the bit being wedged as the drill pipe is pulled from the hole. Efforts to dislodge the pipe by pulling on it only further compact the material which has caused the sticking. The fact that a filter cake is readily formed opposite impervious formations opens a new line of thought to the driller.

Factors Affecting Filtration and Mud Sheath

Elevated temperatures encountered in wells greatly affect the plastering properties of muds, some muds showing a minimum viscosity at one temperature and other muds at another temperature. Different densities of the same mud reacted differently to temperature. This was shown by Byck.[26]

This was partially credited to the accelerated flocculation at the increased temperatures which altered the physical structure and compressibility of the mud sheath, thus affecting its permeability. It was also found that the muds treated chemi-

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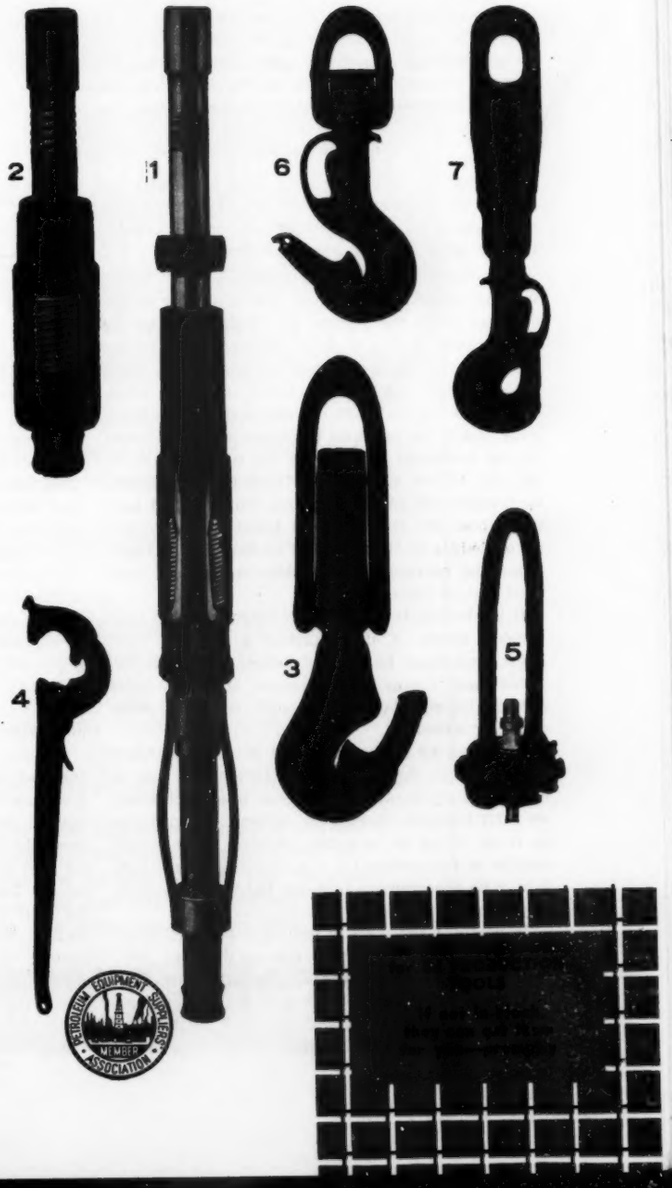

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cally to reduce viscosity showed a shift in temperature for the minimum viscosity to higher values than for untreated mud. In the above work it was shown that viscosity had no apparent effect on the plastering characteristics of the mud. The determination of the plastering qualities of the mud can only be obtained by making the tests as nearly as possible under the temperature conditions encountered in the well.

The filtration of mud is primarily affected by the amount and nature of the solids present, degree of dispersion of solids, distribution of particle size, degree of hydration, and presence of dispersing or agglomerating agents. In general, preponderance of highly hydrated colloidal material and presence of a dispersing agent are conducive to the lowest rate of filtration.[27]

Solids in the mud may have both an undesirable and desirable effect. At one stage they are beneficial and at another they may be harmful. Particles having a grain size as large or slightly larger than the grains in the formation will aid in starting the mud sheath. The actual sheath can then be developed by the small particles down to colloidal dimensions of clay and other materials in the mud. Presence of an appreciable amount of sand tends to reduce the effectiveness of the mud sheath. Plugging agents (fibrous material of all kinds) have much the same effect; helping to seal a porous formation and giving the mud a foundation for the building of a mud sheath and yet cutting down the effectiveness of the unit thickness of the filter cake.

From recent literature on the subject it is indicated that viscosity, as such, is no longer to be depended on as an indication of the effectiveness of mud in sealing off formations and greater dependence should be placed on the filtration and wall-building qualities and other properties.

Gel Strength

Settling of cuttings in the mud is greatly retarded by presence of materials that impart to the fluid a high static viscosity, or a viscosity that is great at low rates of shear.[28]

Importance of gel strength comes from it preventing sticking of drill pipe due to settling of the cuttings while the pumps are inoperative during the making of a trip. As replacement of the bit often requires several hours on moderately deep holes and as much as 12 hours on deep wells, suspension of cuttings is necessary. Efficiency with which the material is suspended is indicated by the readiness with which the new bit goes to bottom. Where mud has sufficient gel strength, no trouble will be experienced, while a mud having a poor gel strength will leave cuttings piled up on ledges in the hole and on bottom. At times it may be necessary to circulate out several hundred feet of these cuttings.

It is obvious that settling is more rapid in less-viscous fluids. A mud having a definite yield point, that must be applied before motion is initiated, will retain in suspension those particles not sufficiently large to furnish the yield-point shearing stress.

Muds can be made which gel in a few minutes if allowed to stand quiescent. Ordinarily this is not necessary as a fairly viscous mud will develop sufficient gel strength to support the cuttings in from 15 to 30 minutes. Where considerable trouble is encountered due to settling of cuttings it may be necessary to increase the rate of gelling of the mud.

Property of the mud to gel must be considered in the light of settling of the cuttings in pits. Motion in the pits is necessary to allow cuttings to settle, and if mud is allowed to gel cuttings will be retained in the mud.

On deep wells it will sometimes be impossible to break circulation following the running of casing due to high gel strength of the mud. This is generally overcome by circulating some gelled fluid out of the hole by starting the pumps at intermediate points while running casing. Viscosity of the mud coming from the hole will be much higher following a trip than it will just before the trip was made as mud in the hole has gelled and stirring will be required to break up the gel. In many cases chemical treatment to reduce the viscosity will be necessary. Gelling of mud in the pits serves no useful purpose and can be prevented by light agitation with the mud guns while the trip is being made.

Thixotropy

Thixotropy is a special case in the phenomenon of gelation. Some authors object to the use of the expressions "gel strength" and "gel forming." They are undoubtedly right in this objection, but the term has come to have wide usage in the United States, probably due to the aversion to an expression which conveys little to the lay mind.

Viscosity curve taken on drilling well. Note that after each trip the viscosity rises and is controlled by admixtures and chemicals

Thixotropy is defined as being an isothermal reversible sol-gel transformation.[29] This definition does not specify the time for transformation nor relative change in the gel strength. From a practical standpoint, however, it is essential that the change occur at a moderate rate, measured in the order of minutes, and that gel strength vary within certain limits, low enough on one hand to permit easy flow and high enough on the other to suspend cuttings and weighting material when quiescent. The subject of thixotropy has been extensively studied and papers written by Ford, Loomis and Fidiam[30] and by Garrison, Ten Brink and Elkin.[29] Evans and Reid discuss it at length.[31]

Control of thixotropy may be an answer to some of the problems, particularly a reduction in the amount of viscosity-controlling chemicals needed on a well. Present general practice is to treat the mud while drilling to reduce the viscosity and by the time the bit is worn out the desired value will be approached. During the time the trip is being made the viscosity again increases and the chemical treatment must be repeated. A mud with sufficient gel strength to support cuttings, which reduces its viscosity with very little movement or stirring, would be much better.

Mud does not necessarily have to be at rest to gel as the action is reversible and probably goes on even at high rates of flow although the disturbance is more than enough to offset the tendency to gel. Where the rate of flow is slow or moderate, thixotropy may cause a noticeable rise in viscosity. Increase in movement of the fluid, or decreasing the rate of gel, are the alternatives presented.

Stability

Some muds are quite stable and will show no marked separation even though allowed to set for a considerable period. Other muds will separate quite readily, water rising to the top and heavier particles settling to the bottom. Thoroughness with which mud is mixed has some effect, although more viscous muds, and particularly thixotropic muds, are quite stable. Sand and cuttings reduce stability of the mud. Rate of settling in the drilling fluid is dependent on viscosity, plasticity, colloid content, size of particles, and density of the fluid.

Violent agitation by jetting or gunning the mud will increase its stability. Chemical treatment may either increase or decrease the stability, depending on the treatment. Presence of salt generally decreases stability. Bentonite greatly increases stability of the mud, particularly if the mud is kept slightly alkaline.

Salinity

Changes in weight, volume and viscosity of mud are often caused by encountering salt water, although these changes may sometimes be due to other causes. Salt is also contained in the strata drilled, so its presence in the mud does not necessarily indicate that water has been encountered. Salt will cause an increase in specific gravity and occasionally this may be used to advantage.

Principal effect of salt on mud is to make it less stable, cause it to flocculate and thus give a false viscosity and gel strength. Some admixtures will not mix readily in salt water but they can be mixed in fresh water and then added to the mud. An admixture which is not affected by salt water may also be selected. The per cent of salt in mud may be reduced by the addition of water. Where large salt beds are encountered the mud may be treated with caustic and quebracho.

Alkalinity and Acidity

Whether mud is alkaline or acidic will depend on the formations penetrated, the material used to make the mud and the chemical treatment which has been given it. The pH, or the concentration of the hydrogen ion in the mud, determines whether it is acidic or alkaline, a pH of 7 being neutral. If the pH number is above 7 it indicates alkalinity and below 7 indicates acidity.

Where chemical treatment is being given the mud, the pH must be watched closely to prevent giving the mud the wrong treatment or too much of the right treatment. Where no chemical is being used, pH may be checked occasionally to make sure best advantage is being made of the material used.

Due to the fact that shales normally contain some alkaline salt, drilling mud will ordinarily assume a pH of about 8. This is enough to help any bentonite added in the making of a stable mixture. If the pH is increased to 9.5 or 10, the mud will flocculate, become inactive and its wall-building properties will be decreased. This may be observed when large quantities of cement are drilled, the mud losing its thixotropy, gel strength increasing to a high viscosity so the mud will not flow. If it is necessary to increase gel strength or viscosity, it may be done by adding an alkali and increasing the pH, but this also reduces the colloidal material in the mud.

By decreasing the pH an opposite effect may be

attained, gel strength and viscosity being reduced. The mud also becomes inactive and water loss will be increased if sufficient acid is added to bring the pH to 5.5 to 7. Unless a mud engineer is supervising the operation and unless there is some good reason for changing the pH of the mud, it should be left alone.

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2,600 Ft. of Cemented Tubing Removed From Coastal Well

(Continued from Page 32)

in with a mill and milling out the bottom of the section in the cement. Several times, also, the top of the tubing in the hole was found mashed, or bent, so that it was impossible to go inside with the inside cutting tool for a cut. It then was necessary to run a mill and mill off the bad portion. At several places, the tubing was found over to one side of the hole in the 5½-in. casing, which necessitated milling out to run the 4-in. pipe over the top.

At another time, the inside cutting tool broke off in the tubing. However, operators on this occasion were successful in running an outside cutting tool, recovering the section along with the inside cutting tool.

Last hard cement was found at about 8,100 ft., and from there to around 8,300 ft. was soft cement, with 14-lb. Baroid to bottom. The tubing through the soft cement and Baroid was washed over without trouble, and cut and pulled in approximate 1,000-ft. sections, down to within about 20 ft. of the top of the cement retainer.

Recovering Jars

Next, a string of 4½-in. flush joint, with plain bottom end, was run with a view to washing down over the circulating jars on top of the cement retainer. It was expected that after washing down over the jars it would be necessary to make another trip to come out of the hole and then go back in with an overshot to tie on and back the jars off above the retainer. However, in coming out of the hole with the wash pipe, the jars, which fortunately had become engaged with the wash pipe and had back off, were found on the bottom of the pipe, saving an extra trip for them. The retainer then was drilled out.

With the tubing string and retainer out of the hole, it then was only necessary to wash to bottom, recondition mud, run another tubing string, and complete the squeeze job.

The fishing job, which was carried out under the joint supervision of McCarthy Drilling Co., of which Louis Baker is general superintendent, and engineers of Houston Oil Field Materials Co., Inc., was completed in 90 days. It required a total of 103 round trips. The well itself was drilled in 94 days drilling time.

A unique practice was followed during the fishing job of changing crews, together with toolpushers, at frequent periods. This was done to prevent any one crew from becoming tired of the monotony of this kind of work. The crews were changed with crews on other drilling wells.

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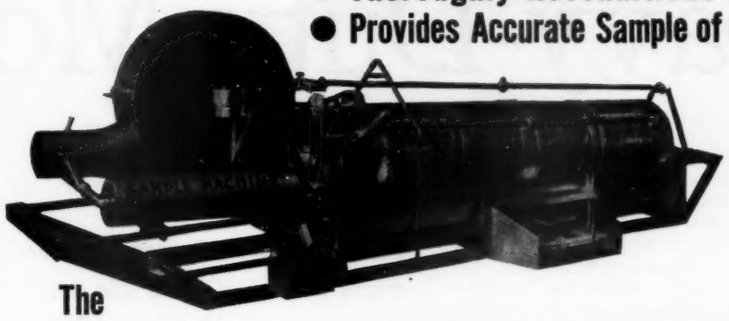

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Heavy-Duty Motor Oils

By H. C. MOUGEY
General Motors Corp., Detroit, Mich.

A.P.I.—Here is presented the major portion of an article delivered before the Division of Refining at the annual meeting of the American Petroleum Institute, Chicago, November 11-15, 1940.

THE name "heavy-duty," as applied to lubricants, is tentative. The American Petroleum Institute has a committee which is studying this subject; and when this committee makes its suggestion as to the name by which these lubricants should be known, I feel sure that the name this committee proposes will be adopted by the automotive industry. In the meantime the tentative name "heavy-duty" is being used.

The story of heavy-duty lubricants is the story of progress. The oil and automotive industries constitute a kind of Siamese twins, and the well being of each industry very closely is bound up with that of the other. The cost of an automobile, and the cost of petroleum products to operate the automobile during its expected life, are approximately the same, and progress in one industry depends to a very large degree on progress in the other industry. . . .

When we contemplate the progress that has been made in fuels, in automobiles, and in roads, the questions naturally arise: "What has been done to make lubricating oil more suitable for heavy-duty service in modern engines"?; and "what changes, if any, are desirable"?

Some of the things the oil industry already has done in improving lubricants are: (1) Oils with low pour points (to improve pumping of the oil at low temperatures). (2) Oils to improve starting in cold weather (10-W and 20-W). (3) Oils with less change in viscosity with change in temperature (high viscosity index). (4) Oils with improved antifriction properties (oiliness, extreme-pressure oils, hypoid lubricants, etc.). (5) Oils with less-easily oxidized sludge-forming materials (improved refining, including solvent refining). (6) Oils for "heavy duty" (not all oil companies now make such oils).

Additional Heavy-Duty Properties

We recently made a series of tests to determine what additional properties oils should have for heavy duty. A General Motors Model 71 diesel was operated for test purposes at full load and full speed without a filter, using a Mid-Continent conventionally-refined S.A.E. 30 oil. The tests showed that the oil increased, with use, in acid and in chloroform solubles; and that the rate of increase was much higher with 235° to 240° F. crankcase oil than with 185° to 200° F. oil; but the increase in "carbon," or "chloroform-insoluble material." was not affected by crankcase-oil temperature—at least until after the oil in the crankcase had become oxidized very badly. This indicated that the increase in acid and chloroform solubles was the result of oxidation in the crankcase, and the "carbon" in the crankcase oil in these tests was the result of thermal decomposition of oil in the combustion chamber—with part of these decomposition products escaping through the exhaust, and part working down past the pistons and getting into the crankcase oil.

If the engine was operated for a long time under heavy-duty conditions on this straight mineral oil without using a filter, the oil in the crankcase oxidized, and the oil that got up into the combustion chamber thermally was decomposed, and the resulting decomposition products in the oil caused trouble.

1. Increase of acid caused bearing corrosion.

2. Increase in oil-insoluble products plugged oil passages and interfered with the supply of oil to surfaces which should have been lubricated.

3. Increase in oil-insoluble products plugged air ports, interfering with combustion, or they stuck on the pistons or piston skirts, causing ring sticking or scuffing of the pistons.

When we operated the engine on the straight mineral oil with small filters which mechanically removed some of the oil-insoluble materials, the troubles due to these insoluble materials were decreased—depending upon the efficiency of the filters and the frequency with which the filter elements were changed.

An Ideal Oil

When we operated the engine on the straight mineral oil with very thorough filtering, using large fuller's earth filters, none of the foregoing troubles occurred, and the engine could be operated for many hundreds of hours without change of oil and with no appreciable effect on either the oil, pistons, rings, or bearings. This amount of filtering, however, was much more than we could expect in normal use of the engine.

These tests indicated clearly that an ideal oil should not oxidize in the crankcase, so that no acid or sludge or other oxidation products would be formed in the crankcase; and it should not form deposits by thermal decomposition in the combustion chamber, which would work past the piston and plug the ring grooves, adhere to the piston or other engine surfaces, or contaminate the crankcase oil and interfere with oil distribution to the surfaces requiring lubrication. If this ideal oil is not possible, then very complete removal of the decomposition products with a suitable filter would solve the problem. If this cannot be done commercially, then another solution might be a special oil. Such an oil would be made from a suitable type of crude and so refined that: (1) It would not form undesirable deposits by thermal decomposition in the combustion chamber. (2) It would not contain objectionable amounts of easily oxidized sludge-forming materials. (3) It would not corrode bearings nor oxidize in the crankcase, forming corrosive acids or objectionable amounts of insoluble oxidation products. (4) It would have the property of preventing any soot or carbon or other decomposition products from sticking to the surfaces of the engine parts. This property is called "detergency."

Oxidation Resistance and Detergency

If such an oil could be obtained, and if it were used with a judicious combination of filtering and draining to prevent an undue accumulation of decomposition products, it should give very satisfactory results in heavy-duty service with either gasoline engines or diesels, or both. However, inasmuch as gasoline engines in general operate at higher speeds than diesels, with resulting higher crankcase-oil temperatures, and as diesels in general are likely to form more products of incomplete combustion in the combustion chamber, it is apparent that the best oil for heavy-duty service in gasoline engines will stress resistance to oxidation in the crankcase, and for service in diesel engines the emphasis will be on detergency.

As gasoline engines and diesel engines differ among themselves in regard to crankcase-oil temperature under heavy-duty service conditions, and in regard to the amounts of decomposition products which form in the combustion chamber and tend to work down past the pistons, it is apparent that different models of diesels or gasoline engines will vary in the way they stress oxidation resistance and detergency.

For example, a diesel which had corrosion-resistant bearings, and which operated with low crankcase-oil temperature but with high ring-belt

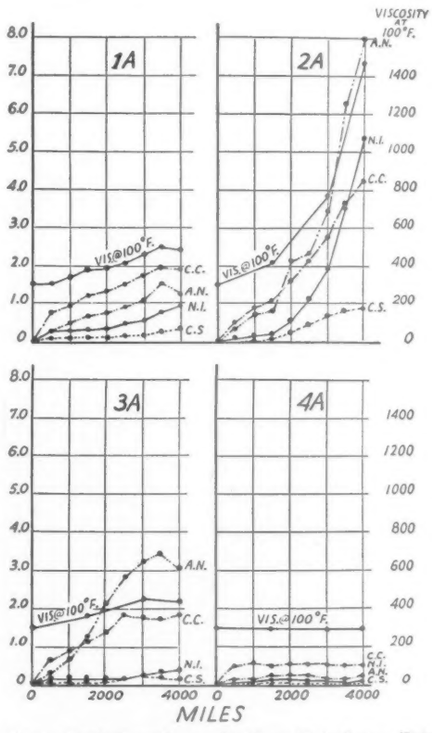


Fig. 1—Used-oil analyses, oils 1A to 4A, inclusive. (Data from General Motors Research General Chemistry Department.) A.N., acid number; C.C., Conradson carbon; N.I., naphtha-insoluble; C.S., chloroform-soluble

temperature, would stress detergency and freedom from the formation of carbon by thermal decomposition in the combustion chamber, with not much importance attached to resistance to oxidation. It probably would be easier to make an oil especially suited for such a diesel by using low to medium viscosity-index (v.i.) stocks.

On the other hand, a diesel with just the reverse in these characteristics would stress resistance to oxidation, with much less importance attached to detergency, and it would probably be easier to make an oil especially suited for such a diesel of using medium or high v.i. stocks. There might by this same kind of difference between

gasoline engines. However, by properly combining detergency, resistance to oxidation, and freedom from thermal decomposition, it would be possible to make a single oil that would be highly satisfactory in all kinds of diesels or gasoline engines, or both.

In this reference to the use of different v.i.-base oils, it should be emphasized that these properties are not due to the v.i. of the oil, nor to its gravity, or color, or other similar properties, but to such properties as its solvent power, its thermal-decomposition products, and to the difficulty of removing easily-oxidizable sludge-forming materials by refining.

Crankcase-Oil Temperatures

In this discussion the subject of high temperatures has been mentioned. According to the fundamental laws that apply to the development of mechanical power from thermal energy, the efficiency of any engine depends upon the difference between the highest temperature at which the working fluid is used and the lower temperature at which this working fluid is exhausted. This means that the trend of temperature level in engines will continue to be high; and as automotive engineers learn of ways in which temperatures of any particular parts of the engine can be lowered, the tendency will be to take advantage of such a possibility by increasing the power and efficiency of the engine, rather than by actually lowering the temperature. Progress in this direction should not be handicapped by any failure of the oil industry to make available lubricants that will operate at as high temperature levels as possible. . . .

In trying to overcome trouble due to condensation of water in the crankcase, the methods that have given the best results are: (1) Frequent draining, to remove the condensed water along with the crankcase oil. (2) Preventing the condensation of water in the crankcase by keeping the cooling liquid warm (thermostats). (3) Removing the condensed water from the crankcase oil (ventilation, with high enough crankcase-oil temperature to make the ventilation effective).

This means that automobile engineers must see to it that the crankcase oil warms up very rapidly to a minimum temperature, and this factor also tends toward a set of conditions wherein high crankcase-oil temperature under heavy-duty service may result, even though engineers recognize that anything they can do to decrease maximum crankcase-oil temperatures greatly will decrease the troubles likely to be experienced in heavy-duty operation.

Testing Heavy-Duty Oils

After the problem of making heavy-duty oils is understood thoroughly and methods of solving the problem are known, the next problem is the testing of such oils; for without test methods it is impossible to develop the oils or to tell how nearly satisfactory the oils are after they have been developed. . . .

In testing oils in our laboratory we have standardized on two tests, one using a Chevrolet engine and one using a Model 71 General Motors diesel engine. The Chevrolet engine test, in the manner in which we conduct it, stresses resistance to oxidation of the crankcase oil. The Model 71 General Motors diesel test stresses both detergency and resistance to oxidation. On request, we shall be glad to send full details in regard to these tests to anyone who is interested; but, briefly, the test conditions are as shown in Table 1. Of course, these conditions are chosen for test purposes, to develop the weaknesses of the oils being tested; and these test conditions are not recommended for regular operation in service.

The oil industry is quite familiar with the problems connected with the development of oils which have the special properties required for heavy-duty oils, but until recently it has not tried to combine all these properties in a single oil. Several years ago when copper-lead and cadmium bearings first came into use in large production, the oil industry was faced with the problem of making oils resistant to the development of acid.

TABLE 1—LABORATORY TESTS

	Chevrolet Engine test	Model 71 General Motors Diesel-Engine Test		
		3-cylinder	4-cylinder	6-cylinder
Revolutions per minute	3,150	2,000	2,000	2,000
Equivalent miles per hour	60	....	....	....
Load, brake horsepower	30	80	106	160
Water (out), °F.	200	180	180	180
Crankcase oil, °F.	280	230	230	230
Oil consumption (approximate value)	500 miles per quart	0.20 lb. per hour	0.27 lb. per hour	0.40 lb. per hour
Miles per quart (calculated for 60 m.p.h.)	500	570	422	285
Length of test, hours	67	500	500	500
Length of test (calculated miles for 60 m.p.h.)	4,000	30,000	30,000	30,000
Bearings	Babbitt (with 1 copper-lead)	Copper-lead	Copper-lead	Copper-lead
Filters	None	(*)	(*)	(*)
Oil change during test	None	None	None	None

*Filters are not used for the first 144 hours (8,640 miles) in order to learn as much as possible about the rate of increase of oil-decomposition products. The regular filter equipment is used during the remainder of the test (356 hours, 21,360 miles).

TABLE 2—SUMMARY OF TESTS

Run No.	Crankcase-oil temperature (°F.)	Jacket-water temperature (°F.)	Speed (r.p.m.)	Temperature of underside piston crown (°F.)	Remarks—
1A	280	200	3,150	500-510	Regular run, load to maintain piston temperature constant (about 25 hp.).
2A	280	200	3,150	300-315	Engine motored, gasoline line disconnected, throttle closed. High combustion-chamber temperature due to heat of compression.
3A	280	200	3,150	275-280	Same as Run 2A, except exhaust valves cut off to avoid compression of air in combustion chamber.
4A	280	200	3,150	275-280	Same as Run 3A, except 0.50 per cent inhibitor *X* and 0.50 per cent inhibitor *Z* added to crankcase oil.

TABLE 3—OPERATING CONDITIONS

Run No.	Decomposition products from combustion chamber—	Oil analysis	Engine condition (disregarding possible effect of the oil on alloy bearings)
1A	Normal, normal testing operating condition	Bad	Good
2A	Large amount of decomposition products resulting from partial decomposition of oil in combustion chamber	Very bad	Very bad
3A	Very low combustion-chamber temperature, almost all of decomposition products in oil originating at crankcase oil	Bad	Good
4A	Very low combustion-chamber temperature, with formation of decomposition products in crankcase oil prevented by oxidation inhibitor	Very good	Very good

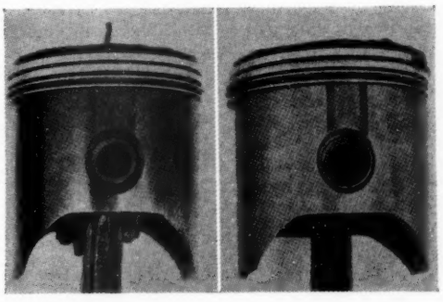


Fig. 2.—Pistons from runs on Oils 5 and 5A. The dark-colored piston is from the run on October 5. The dark color is the varnish formed on the piston in this run. The light-colored piston is from the run on oil 5A. Note the absence of deposits

If the oils were refined to such an extent that the easily oxidized sludge-forming materials were removed, the natural oxidation inhibitors which prevent oxidation of the oil with formation of acid usually were removed also, at least to a great extent. To correct this deficiency, oxidation inhibitors were added—and thus this problem was solved. . . .

Bearing Corrosion

In any discussion of heavy-duty oils, the subject of bearing corrosion always comes up. In any service, bearings should not fail from any cause. This includes failing due to poor antifriction properties, poor resistance to fatigue, or poor resistance to corrosion. When babbitt will produce bearings of suitable resistance to fatigue, it is probable that it will continue to be used, due to its good antifriction and resistance to corrosion. When babbitt is not good enough in resistance to fatigue, the logical answer at present is to use cadmium or copper lead, and to avoid corrosion trouble by using oils which will not form acids nor cause corrosion under service conditions.

There recently have been introduced new bearings which may solve this corrosion problem without sacrifice of the desirable properties of antifriction and resistance to corrosion. . . .

Summary of Tests

As illustrations of the kind of results that can be obtained at the present time in both gasoline and diesel engines under different operating conditions and with different types of oils and addition agents, some of the data from engine tests may be of interest. Except as noted, the tests were made on the test schedules shown in Table 1. In the tests on oil for gasoline engines, Chevrolet engines were used. In the tests on oils for diesels, Model 71 General Motors diesel engines were used. These tests may be summarized as shown in Tables 2 to 6, inclusive.

Effect of decomposition products originating in the combustion chamber in a gasoline engine.

A series of four runs was made to throw light on the problem of decomposition products originating in the combustion chamber. The oil used was a highly refined 20-W Pennsylvania base oil. The pertinent data in regard to the operating conditions are shown in Table 2, and the test data are shown in Table 3 and Fig. 1 (author's Fig. 12).

Run 1A is a normal run. It is apparent that, when most of the oil that gets past the pistons is burned and discharged through the exhaust—largely as Co_2, CO, and H_2O—most of the changes

TABLE 4—OILS FOR GASOLINE ENGINES

Test No.	Purpose of test:	Oil	Miles of test	Oil analysis at end of test: Acid No.	Naphtha-insoluble (per cent)	Chloroform-soluble (per cent)	Egine condition at end of test: Sludge	Varnish on pistons	Effect of oil on alloy bearings
5	To show effect of oxidation inhibitor	Oil A, solvent-refined high v.i. 10-W.	3,500	3.44	2.28	0.73	Slight	Very bad	Corrosive
5A	.....	Oil A plus 3 per cent sulfur-saponifiable oxidation inhibitor.	4,000	0.39	0.63	0.05	None	None	Noncorrosive
6	To show effect of base oil	Highly refined v.i. 20-W.	4,000	1.26	0.92	0.29	Slight	None	Corrosive
6A	.....	Conventional refined Mid-Continent 20-W.	2,000	0.66	1.07	0.87	Very bad	Very bad	Noncorrosive
7	To show effects of detergent and oxidation inhibitor	Oil B, highly refined high v.i. 10-W.	2,000	7.70	0.99	0.45	None	Pistons stuck transparent varnish	Very corrosive
7A	.....	Oil B plus metal compound detergent.	3,000	9.70	3.41	1.75	None	None	Very corrosive
7B	.....	Oil B plus 3 per cent sulfur-saponifiable oxidation inhibitor.	4,000	0.46	0.48	0.11	None	None	Noncorrosive
7C	.....	Oil B plus 3 per cent sulfur-saponifiable oxidation inhibitor plus metal compound detergent.	4,000	0.22	0.38	0.08	None	None	Noncorrosive
8	To show effect of crankcase-oil temperature	Oil C "medium-quality" medium v.i. oil, with crankcase-oil temperature held at 280° F.	4,000	2.62	2.01	1.85	Very bad	Very bad	Corrosive
8A	.....	Oil C, but with crankcase-oil temperature held at 200° F.	4,000	0.27	1.16	0.33	Good	Good	Noncorrosive

in the crankcase oil take place in the crankcase. However, as shown by Run 2A, it is possible to have operating conditions under which an appreciable portion of the oil that gets on the cylinder walls is only partly oxidized, and some of it can get back into the crankcase—further contaminating the crankcase oil. Run 3A illustrates operating conditions wherein practically all the change in the oil occurs as a result of oxidation in the crankcase, and Run 4A shows how this oxidation of oil in the crankcase may be prevented by the use of an inhibitor.

Tests Nos. 5 and 5A show the very great improvement that resulted from adding a suitable oxidation inhibitor to oil "A." Photographs of the pistons from these two runs are shown in Fig. 2 (author's Fig. 13). Tests Nos. 6 and 6A show the advantage of having a base stock from which the easily-oxidizable sludge-forming materials have been removed. However, as previously noted, if such a highly refined oil should not contain sufficient oxidation inhibitor, it is subject to oxidation at elevated temperature with formation of corrosive acids, and with the formation of oil-soluble oxidation products which may be precipitated by the addition of fresh oil—forming sludge, varnish, and eventually coffee grounds.

Tests Nos. 7 to 7C, inclusive, show that, although a detergent may help very greatly in preventing the oxidation and decomposition products from sticking to the engine parts, the problem is only partly solved by the use of a detergent, unless the oil is also resistant to oxidation. These tests also illustrate the difficulty in predicting the condition of the engine from used-oil analysis above. Other conclusions to be drawn from this series of tests are that, if a choice must be made between two oils—one with good inhibitor but poor detergent values, and one with poor inhibitor and good detergent values—it is apparent that for the operating conditions of this test the oil with the better oxidation resistance would be preferable. However, the more desirable combination is an oil good in both oxidation resistance and in detergency.

Tests Nos. 8 and 8A show the importance of crankcase-oil temperatures, and illustrate the point that, even though an oil of "medium quality" may be very satisfactory for medium service, for "heavy duty" oils of superior properties are required.

Oils for diesel engines.

Typical results of tests made on Model 71 General Motors diesel engines, in accord with the Detroit Diesel Division test procedure, are shown in Tables 5 and 6.

The oil-analysis data from the samples of used oil, taken during the test runs, are shown in Table 6. In accord with the test procedure, the first 144 hours are run without a sludge filter. The filter is installed at 144 hours and used during the remainder of the test, changing filters when necessary. With oils "F" and "H" only one filter was used; with oil "G," seven filters were used.

In the case of oil "G," this was more than was actually necessary, because in the test with this oil the filter would remain in good condition about 125 hours; but the extra filters were used to learn more about the effect of filters, and to try to find out if more frequent changing of the filters would remove the desirable addition agents in this oil.

If an oil is low in detergent properties, the decomposition products from the oil tend to stick to all engine parts, including the filter surfaces. If the oil is high in detergent properties, these decomposition products are less likely to stick to the engine parts or to be caught in a filter. This means that, in actual service, filters will plug up much more rapidly if the oil is low in detergent properties. It also means that, in order to maintain the filtering of the oil in a satisfactory manner, the filter elements must be changed much more frequently if the oil is low in detergent value. Of course, it is possible to produce an oil so high in detergent value that a filter will have no effect on the oil. The dirt is so highly dispersed that the filter will not hold it. . . .

Summary

1. With improvements in engines, fuels, and roads, the service requirements on gasoline and diesel engines are increasing rapidly. This means that the lubricating oils should be able to lubricate the engines under the heavy-duty service conditions that are becoming more common.

2. In order to meet these requirements, the lubricating oils should be resistant to oxidation or chemical decomposition in the crankcase; the oil must not be corrosive to engine parts; the products of thermal decomposition in the combustion chamber should not be excessive; and the oil should be of such a nature that the decomposition products that get into the oil will not adhere too strongly to pistons, rings, or other engine parts.

3. Oils and fuels are just as much parts of the engine as pistons and crankshafts. Progress in engines and progress in oils and fuels must go hand in hand, and neither the oil nor automotive industry can make much progress by itself, or if progress lags behind in the other industry.

4. These desirable results can be obtained by the oil and automotive industries at the present time.

TABLE 5—OILS FOR DIESEL ENGINES

Oil—	Hours of test	Oil analysis	Engine condition: Bearings	Pistons and rings
Oil D (medium v.i. oil, low in both oxidation resistance and in detergency)	100	Bad	Good	Bad
Oil E (low v.i., low in oxidation resistance but good in detergency)	116	Bad	Good	Bad
Oil F (medium v.i., high in oxidation resistance and high in detergency)	500	Good	Good	Good
Oil G (high v.i., high in oxidation resistance but intermediate in detergency)	500	Good	Good	Fair
Oil H (high v.i., high in oxidation resistance and high in detergency)	500	Good	Good	Good

TABLE 6—OILS FOR DIESEL ENGINES

Hours	Neutralization No.: Oil D	Oil E	Oil F	Oil G	Oil H*	Chloroform-soluble: Oil D	Oil E	Oil F	Oil G	Oil H*	"Carbon" (naphtha-insoluble minus chloroform-insoluble): Oil D	Oil E	Oil F	Oil G	Oil H*
20	0.1	0.4	...	...	...	0.04	0.05	...	...	...	0.24	0.19	...	0.18	0.06
40	0.1	0.8	...	0.1	0.3	0.12	0.1	...	0.08	0.01	0.40	0.24	...	0.28	0.06
60	0.2	0.9	...	...	...	0.24	0.3	...	...	...	0.56	0.22	0.03	0.42	0.10
80	0.4	1.4	...	0.1	0.3	0.80	0.7	...	0.06	0.02	0.88	0.42	...	0.42	0.16
100	0.4	2.2	...	0.1	0.4	1.6	1.5	...	0.08	0.02	1.6	0.64	0.05	0.36	0.24
116	...	2.1	...	...	...	...	2.2	...	...	...	...	0.80	...	...	...
125	...	...	0.2	...	...	...	...	0.15	...	...	...	...	1.29	...	...
144	...	...	(†)	(†)	(†)	...	...	(†)	(†)	(†)	...	...	(†)	(†)	(†)
200	...	...	...	0.2	0.5	...	...	...	0.05	0.02	...	...	...	0.04	0.20
300	...	...	...	0.2	0.5	...	...	...	0.04	0.03	...	...	...	0.04	0.34
350	...	...	0.3	...	...	...	...	0.20	...	...	...	...	2.12	...	...
400	...	...	...	0.2	0.6	...	...	...	0.04	0.02	...	...	...	0.04	0.18
500	...	...	0.3	0.4	0.7	...	...	0.18	0.04	0.02	...	...	2.17	0.04	0.22

*Analyses of oil samples from test with oil "H" were made in the laboratory of the company making the test on oil "H." However, check analyses made on several samples indicate that the results are very similar to those obtained in our laboratory, except that the neutralization numbers are somewhat higher than we would obtain. Analysis on all other oils made in our laboratory.

†In accord with the test procedure, filters were installed at 144 hours.

QUESTIONS ON TECHNOLOGY

By W. L. NELSON, TECHNICAL EDITOR

Estimating Oil Viscosity At Zero Degrees

We have difficulty in estimating or determining the viscosity at zero as called for in the specifications of S.A.E. 10W and 20W automobile oils. Can you suggest a method of getting the viscosity at zero?—R. A. N.

This question has been recently answered by a release from the Society of Automotive Engineers as follows:

Several years ago considerable laboratory and field test work was done on engines by both the automotive and oil industries to determine the effect of various factors on the torque required to start an engine at low temperatures. It was found that the viscosity of the oil at the temperature of the crankcase was one of the most important factors. While the results varied from engine to engine there was a definite indication that marked increases in viscosity made starting difficult.

As a result of this information the S.A.E. Lubricants Division prepared and published for information in 1933 a trial classification for winter crankcase oils designated as 10W and 20W. The limits were as follows:

Oil—	Viscosity in Saybolt sec. at °F.
10W	5,000 to 10,000
20W	10,000 to 40,000

This classification was not standardized by the S.A.E., but it has been adopted by both the automotive and petroleum industries and is now thoroughly recognized as an "industry standard" without official S.A.E. status.

Since there is at present no official method for estimating or determining viscosity at 0° F., many commercial lubricants, meeting the original classification of 10,000 seconds at 0° F., are either rejected or reported as being misbranded. To establish an official method for estimating viscosity at 0° F., and to clear up the misunderstanding that exists at the present time, the following statement was prepared by the S.A.E. Lubricants Division, Subdivision C, in cooperation with A.S.T.M. Committee D2, Subcommittee V, and has been approved by the Lubricants Division for publication as general information in the 1931 S.A.E. Handbook, supplementing the lubricants classification.

Method for comparison of results.

The viscosity at 0° F. of engine crankcase oils and transmission and rear-axle lubricants shall be estimated by extrapolation on the A.S.T.M. viscosity-temperature chart, A.S.T.M. Designation: D341-39, from kinematic viscosities determined by the tentative method of test for kinematic viscosity, A.S.T.M. Designation D445-39 T, at two temperatures that are at least 60° F. apart (for example, 70° F. and 130° F. or 100° F. and 210° F.), or from Saybolt viscosities determined by the standard method of test for viscosity by means of the Saybolt viscosimeter, A.S.T.M. Designation: D88-38, at 70° F. and 130° F. in the case of low-viscosity engine crankcase oils (below S.A.E. 30) and at 100° F. and 210° F. in the case of high-viscosity engine crankcase oils, and transmission lubricants.

The error in estimating viscosities at 0° F. is cumulative and is far greater than the errors in individual viscosity determinations. Assuming absolute accuracy in extrapolating on the viscosity-temperature chart, an error of plus or minus 0.5 per cent in viscosity determinations at 100° F. and 210° F. may, in case of an oil having a viscosity of 10,000 seconds at 0° F., result in an error of 10 to 15 per cent in the estimated viscosity as 0° F. To this error, resulting solely from errors in viscosity determinations, must be added the actual error involved in the process of extrapolation, which should not exceed an additional 15 per cent. With proper attention to details of procedure outlined in the A.S.T.M. methods, the estimated viscosity at 0° F. reported by experienced operators working in different laboratories with standardized equipment should not differ more than the amount shown in the following table:

Estimated viscosity at 0° F. extrapolated from:	Maximum error in estimated viscosity at 0° F.
Saybolt viscosities determined at 100° F. and 210° F.	Plus or minus 20%
Saybolt viscosities determined at 70° F. and 130° F.	Plus or minus 10%
Kinematic viscosities determined at 100° F. and 210° F.	Plus or minus 10%
Kinematic viscosities determined at 70° F. and 130° F.	Plus or minus 5%

The estimated viscosity at 0° F., determined in accord with the above procedure, may differ from values obtained by extrapolation on the original A.S.T.M. viscosity-temperature chart (A.S.T.M. Designation: D341-32 T). For example, an oil having an estimated viscosity of 10,000 Saybolt seconds at 0° F. when extrapolated on the original chart from viscosities determined at 100° F. and 210° F., may have an estimated viscosity as high as 12,000 Saybolt seconds when the extrapolation is made in accord with the recommended procedure on the new charts (A.S.T.M. Designation: D341-39). This increase from 10,000 to 12,000 seconds is due solely to the fundamental difference between the old and new viscosity-temperature charts and does not include differences in reported values due to errors in individual determinations and in extrapolating.

If the viscosity at 0° F. is extrapolated from kinematic values determined at 100° F. and 210° F. or from Saybolt values determined at 70° F. and 130° F. in accord with the recommended practice, the error in the determined viscosity at 0° F. may be as high as plus or minus 10 per cent. Therefore, an oil having an estimated viscosity of 10,000 Saybolt seconds on the old chart and 12,000 Saybolt seconds on the new chart may be reported as high as 13,200 Saybolt seconds. If the viscosity at 0° F. is extrapolated from Saybolt values determined at 100° F. and 210° F. (this practice is not recommended on account of the difficulty of accurately determining Saybolt viscosity at 210° F.), the error may be as high as plus or minus 20 per cent and the oil having an estimated viscosity of 10,000 Saybolt seconds at 0° F. on the old chart may be reported as high as 14,400 Saybolt seconds without any actual change in the viscosity of the lubricant.

Significance of Neutralization Number

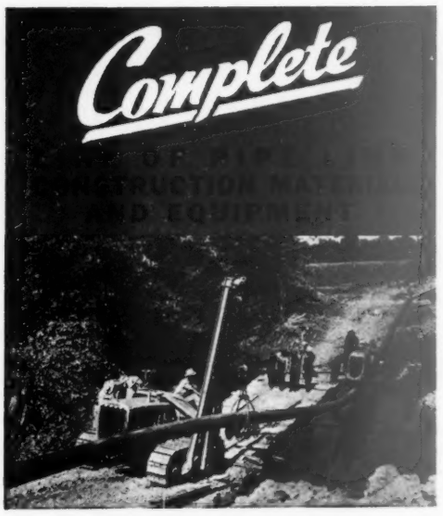
I should like to know the significance of the A.S.T.M. neutralization number of lubricating oils. What are considered to be the limits for a good lubricating oil both before and after using?—D. P., Jr.

The neutralization number of an oil is a measure of the presence of acidic materials such as organic acids that are normally a part of most crude oils, and mineral acids which may be present by faulty removal of acids during chemical treatment. The presence of mineral acids even in minute amounts is obviously deleterious and cannot be countenanced in either new or used oils. Mineral acids are measured by a modified neutralization-number test which is referred to as the mineral acid (or alkali) neutralization number. The only widely accepted source of mineral acids is faulty chemical treatment, but a few technical men have felt that mineral acids (sulfuric acid) were produced in minute amounts during the use of high sulfur oils.

The significance of organic acidity is more complicated. Some crude oils contain more organic acids than others and hence the neutralization number varies widely unless resort is made to special treating processes. The organic acids, however, that are normally present in oils are not corrosive and have no direct harmful effects. Some even contend that the presence of organic acids, as in compounded oils or the earlier "germ processed" oils, improves the friction characteristic of the oils. The fact that the neutralization number is usually not included in the tests of materials undergoing engine-block or road tests is clear indication of the lack of importance of this property in the minds of many experimenters.

The average neutralization number of new oils is probably between 0.12 and 0.20 and for reclaimed oils between 0.12 and 0.70, depending upon the completeness of the reclaiming process. The Government accepts new oils having a neutralization number under 0.3 but gives additional credit if the value is below 0.1 (VV-O-496). The neutralization number increases most rapidly during the first few miles of operation and the lower the initial value, the more the percentage increase during service. An indication of the increases during service is given in the accompanying tabulation of scattered data.

	Before	After	Ratio	Notes
New oil	0.15	0.65	4.34	3,110 miles in Chevrolet
New oil	0.49	0.48	3.22	3,763 miles in Pontiac
New oil	0.28	0.50	1.79	350-hr. test
Pennsylvania oil—solvent treated	....	....	1.525	50-hr. test
Pennsylvania oil	....	....	1.2474	50-hr. test
Mid-Continent oil—acid treated	....	....	1.195	50-hr. test
Gulf Coast oil	....	....	1.923	50-hr. test
New oil	0.139	0.286	2.06	200 miles in bus
Reclaimed oil	0.249	0.671	2.70	200 miles in bus
New oil	0.038	0.275	7.23	1,000 miles in car
Reclaimed oil	0.125	0.375	3.00	1,000 miles in car
New oil	0.11	0.61	5.55	Special endurance test, bus oil
Reclaimed oil	0.63	0.47	0.75	Special endurance test, bus oil
New oil	0.28	0.17	0.61	Special endurance test, car oil
Reclaimed oil	0.19	0.17	0.90	Special endurance test, car oil



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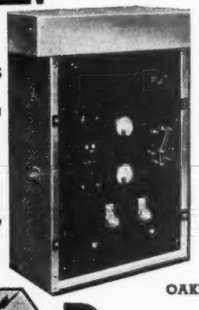

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Pipe-Line Activity

E. B. Kesinger Appears Before Wisconsin Pipe-Line Hearing

WASHINGTON, D. C.—E. B. Kesinger, general superintendent of the Natural Gas Pipeline Co. of America, was permitted by Federal Power Commission examiners Saturday to place in the record data relating to his company's proposed rate schedule for gas distribution to Wisconsin utilities.

A motion to strike all of Mr. Kesinger's testimony relating to a proposed optional rate in Wisconsin was made by Posey T. Kime, Power Commission attorney, and was supported by attorneys for the Western and Independent Natural Gas companies, which have filed applications to serve Wisconsin. The Natural Gas Pipeline Co. is opposing the applications of Independent and Western and proposes to serve the same territory.

Mr. Kime and attorneys for Western and Independent objected to Mr. Kesinger's testimony on the ground that it was based in part on comparisons between the Natural Gas company's expected rate for Wisconsin and the rate in cities served by Natural Gas Pipeline in Illinois and Iowa. The objectors contended some of the cities Mr. Kesinger named were not served by Natural Gas Pipeline.

Milwaukee Gas Pipe Line Is More Than Half Completed

In the construction of the 162-mile, 20-in. pipe line to Milwaukee, Wis., for Natural Gas Pipeline Co. of America, at the beginning of this week Dempsey-Wilson Construction Co. had completed more than 70 miles and I. C. Little had completed more than 23 miles. The project calls for the construction of a line from the Geneseo, Ill., compressor station on the gas company's trunk line to Milwaukee, Wis. All of

MISSISSIPPI RIVER CROSSING FOR NEW STANOLIND PIPE LINE

Two 12-in. lines have been laid across the Mississippi River recently by Jones & Brooks, operating as Texokan Co., in the construction of a 45-mile section of the 165-mile 12-in. line now being laid for Stanolind Pipe Line Co. between Wood River, Ill., and La Plata, Mo. The river crossing is 3 miles from the terminal of the line at the tank farm of the Wood River refinery of Standard Oil Co. of Indiana. The distance across the river at this point is 4,000 ft.; 1,500 ft. of this is across the navigable channel. Work at the crossing started October 1 and was practically completed Nov. 10.

When the photograph was taken at the beginning of the crossing work, the lines had not been separated by the specified distance of 20 ft. The principal items of floating equipment employed in making the crossing are to be seen in the picture. In the distance are two dredges; in the foreground are two laying barges, a derrick boat, and a tug boat. Sections of pipe are welded on the laying barges and tied to the part of the line already completed. After tying in joint sections of pipe on the ramps, pipe slides into the water as the barges are towed ahead. A barge was used in lowering the lines in the deep channel of the river; this served to support the pipe and prevent it from bending.

On the completion of the river crossing, this contractor proceeded with the laying of pipe on the Missouri side. He is employing the stovepiping method and has progressed at the rate of 8,000 to 10,000 ft. per day. The balance of the line, consisting of 120 miles, is being laid by O. C. Whitaker Co., which is doing the work with two spreads. Whitaker has laid a loop of 15 miles along the main line southwest of La Plata, Mo.

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Pipe-Line Personalities . . . . . O. E. Dempsey

O. E. DEMPSEY grew up in the vicinity of Enid, Okla., and began his career at the age of 18 with a local gas company.

He was one of the first to see the possibilities of welded pipe lines, and for many years trained men in this new field, putting in new gas plants at various cities around Enid and Oklahoma City; later he joined the Hope Engineering Co. as welding superintendent in the Bartlesville district. It was from this point that he joined the Army in 1917, after which he went back to Bartlesville to enter business for himself. He made a specialty in laying welded pipe lines, and helping to develop equipment to handle this new method of laying pipe.

Some of this early experience was pioneering in the rough.

In 1930, Mr. Dempsey's firm of Kelly-Dempsey Co. received a contract from Borger, Tex., to St. Louis, Mo., this being one of the longest lines ever let in one contract.

In 1940, he formed a new partnership with Loy Wilson, under name of Dempsey-Wilson Construction Co., which at present is laying 100 miles of solid welded 20-in. gas line in Illinois.

Few men have had more experience in the pipe-line field than has had Mr. Dempsey. He has made Tulsa his home for the past 16 years. He is married and has one child.

the pipe for the project is furnished by A. O. Smith Corp. Pipe for the main line has a weight of 59.231 lb. per. sq. ft. and wall thickness of 9/32-in. For river crossings, 20-in. pipe has a weight of 78.599 lb. and ⅜-in. wall thickness; 12-in. has a weight of 49.562 lb. and wall thickness of ⅝ in.

Stanolind Starts 244-Mile Repair Project for North Texas System

In order to be in a position to handle larger shipments in North Texas, Stanolind Pipe Line Co. is undertaking the repair of 244 miles of line, extending from Mexia via Graford Junction to Bowie station. This includes 169 miles of 8-in. and 75 miles of 10-in.

Work will be done by the company's crews. An announcement has been made by William G. Heltzel, vice president; J. B. Harshman, general superintendent, and A. M. Hill, maintenance superintendent, that the same procedure will be followed which was used in repairing the line from Wyoming to Freeman, Mo., in 1936. Other officials directly in charge of the project are: O. H. Powell, superintendent, and J. J. Hill, division superintendent. Three crews have been organized for the undertaking. Work began last week and it is scheduled for completion about February 1.

Widespread Operations of Williams Brothers Corp.

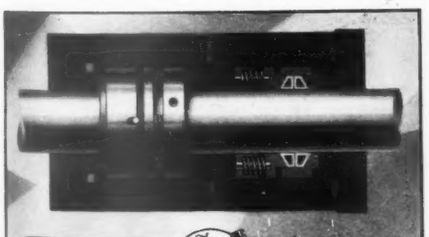
Last week Williams Brothers Corp. started work on a 46-mile 8-in. line for Sinclair Refining Co., pipe line department, between Welch and Casper, Wyo.; work is directed by G. A. Manuel, superintendent for the contractor. At the same time construction was started for an 80-mile 8-in. line between Lubbock and Seagraves in West Texas for Magnolia Pipe Line Co.

This contractor has recently completed a 15-mile 8-in. line for Sinclair near Baroil, Wyo. For Magnolia, this firm has recently completed a 15-mile 8-in. line near Houston, Tex., and a 200-mile 4½-in. gasoline line from Fort Worth to Oklahoma City. For Gulf Pipe Line Co. it has done work on several jobs in Texas.

Another piece of work started by Williams Brothers Corp. last week is the project for laying 12 miles of 10-in. in parts of West Virginia, Ohio, and Pennsylvania. It crosses the Ohio River at Steubenville, Ohio; work was begun at Eldersville, Pa.; this line connects with the system of Manufacturers Light & Heat Co., Manufacturers Gas Co., and Pennsylvania Fuel Supply Co., for which this contractor completed 140 miles of line earlier in the fall. This firm has made substantial progress in laying a 19-mile line for Pacific Gas & Electric Co. between Lodi and Rio Vista, Calif.

The largest undertaking of Williams Brothers Corp. at the present time is the construction of approximately 200 miles of 10-in. and 12-in. for a crude-oil trunk-line system for Pan American Pipe Line Co. between East Texas and the Gulf Coast. The company has four gangs on the job; the two at the northern end are directed by H. L. Davis; the two at the southern end are directed by Ben Law. This job is under the supervision of Guy S. Conners, general superintendent.

Work just completed also includes 8 miles of 7 and 8-in. in the vicinity of Houma and Whitecastle, La., for Lake Long Gas Co., which is laying the line to serve a sugar mill; furthermore, 20 miles of 10-in. has just been taken up for Texas Pipe Line Co. near Smackover, Ark.



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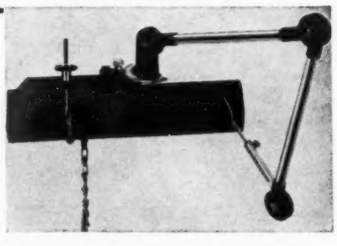

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FIELD DEVELOPMENTS...

HIGHLIGHTS FROM THE WEEK'S NEWS—

WEST TEXAS: A new oil field and a new gas field have been opened in southern Andrews County during recent weeks and at present the play has spread into northern Ector County with four wildcats active in the area.

WEST CENTRAL TEXAS: Discovery of a new field in Shackelford County, indications of a new discovery in Callahan County, and field extensions in Jones County featured a busy week in the West Central area.

NORTH TEXAS: Several of North Texas' more recent field discoveries were given extensions during the week and to keep the play active, wildcats were staked throughout the western part of the Fort Worth basin.

EASTERN TEXAS: The Hawkins area of Wood County was given a new test, the first since the yet ungaged discovery first showed oil several weeks ago. The new test is about 3½ miles south of the Manziel 1 Morrison.

SOUTHEAST NEW MEXICO: A gas discovery was recorded in northeastern Eddy County and a new wildcat test was staked in the northwestern part of Eddy County.

TEXAS GULF COAST: Galveston Bay receives third field as production opened on Fishers Reef prospect, offshore from Chambers County.

SOUTHWEST TEXAS: Cook Mountain sand in Weser area, Goliad County, shows evidence of oil production. New producing area opened east of Orange Grove and new sand opened in Ben Bolt field, Jim Wells County.

LOUISIANA GULF COAST: New sand opens first crude production in La Pice field, St. James Parish. Lake Salvador field, St. Charles Parish, extended by new sand discovery.

NEBRASKA: Ohio Oil Co. entered the Falls City basin play in a big way by buying oil wells in the Falls City pool and leases on 65,000 acres from Pawnee Royalty Co., discoverer of the pool.

KANSAS: The East Roxbury pool opener in McPherson County was completed for 495 bbl. daily. A wildcat was started in Pottawatomie County, scheduled to go to 4,000 ft.

OKLAHOMA: Wildcat exploration, already represented by 66 outposts in 30 counties, was extended as several tests in widely separated areas were started. A Greater Seminole discovery was being tested in Wilcox sand.

ILLINOIS: An old Devonian producer in the Salem field is to be deepened to the Trenton. Effingham and Perry counties may soon have their first pools.

CALIFORNIA: As wells are drilled lower on the structure at Paloma they obtain better results. One is now drilling which, it is hoped, will miss the gas cap.

COMPLETIONS IN ALL FIELDS . . .

(Week Ended November 16, 1940)

	Oil	Gas	Dry	Total	1940 total comp. to date	1939 total comp. to date
N. Y., Pa., and W. Va.	85	14	4	103	5,382	3,164
Ohio	8	18	5	31	1,069	751
Indiana	13	0	6	19	431	303
Kentucky	3	0	5	8	444	627
Illinois	56	0	21	77	3,388	3,203
Michigan	10	4	12	26	1,052	1,301
Kansas	28	3	7	38	1,586	1,184
Oklahoma	19	7	12	38	1,611	1,539
Texas:						
North Central Texas	36	1	20	57	2,565	2,141
West Texas	21	1	1	23	1,600	1,612
Texas Panhandle	7	0	0	7	515	383
Eastern Texas	10	0	6	16	558	630
Texas Gulf Coast	20	1	4	25	1,102	1,189
Southwest Texas	18	0	19	37	1,856	2,145
Total Texas	112	3	50	165	8,196	8,100
North Louisiana	7	2	5	14	574	473
Louisiana Gulf Coast	9	0	9	18	902	636
Total Louisiana	16	2	14	32	1,476	1,111
Arkansas	0	0	0	0	159	226
Montana	4	5	0	9	210	151
Wyoming	3	0	0	3	144	120
Colorado	2	0	0	2	15	20
New Mexico	3	0	2	5	484	509
California	16	0	4	20	907	810
Miscellaneous	2	0	3	5	211	58
Total United States	380	56	145	581	27,765	23,335
Total previous week	399	63	129	591		
Week ended Nov. 18, 1939	422	32	142	596		

SUMMARY OF OUTSTANDING FIELDS . . .

(Week Ended November 16, 1940)

	Active operations	Oil completions	Initial prod.	Total No. oil wells	Daily av. prod.
TEXAS:					
K.M.A.	55	7	2,867	1,511	34,620
Wasson	37	4	3,329	990	29,550
Ector County	49	3	1,927	2,339	41,597
Hull-Silk	52	1	348	381	10,171
East Texas	20	8	324	25,929	374,750
OKLAHOMA:					
Cumberland	11	0	0	9	3,000
Hewitt	23	2	275	781	5,300
KANSAS:					
Bornholdt	9	2	750	137	3,250
Silica	7	1	1,424	716	16,400
Stoltenberg-Wilkins	18	4	446	165	3,460
Trapp	6	2	946	591	15,650
ARK-LA-TEX:					
Olla	8	6	920	67	6,665
Cotton Valley	3	0	0	160	13,195
MICHIGAN:					
Adams	10	0	0	22	1,915
ILLINOIS:					
Salem	4	1	9	2,950	130,050
Louden	27	4	978	1,100	69,725
Centralia	3	0	0	717	17,400
Other basin fields	298	51	9,804	2,705	112,675
Old fields	.....	....	.....	.....	10,990
NEW MEXICO:					
Lea County	49	0	0	2,588	85,200
Eddy County	45	3	164	635	17,260
MISSISSIPPI:					
Tinsley	8	1	480	91	14,965

By

STAFF CORRESPONDENT

Trenton Test to Be Drilled In Salem Field

MATTOON, Ill., Nov. 18.—Illinois' activity remained at an increased peak during the week with the completion of 74 wells, as compared with 77 completions for the preceding week. Of these, 56 were oil producers. Louden recorded four completions with an initial production of 978 bbl., or 239 bbl. per well. Activity in the Salem field continued to decline with the completion of one small producer, one dry hole, one salt-water disposal well, and one recompletion which was a small producer. The total initial production for the field was 24 bbl. White County remained well in the lead with the completion of 1 dry hole and 19 producers good for 5,474 bbl., while Wayne County had 1 dry hole and 11 producers which came in for a total of 1,004 bbl. The remaining 34 wells were in various scattered counties of the basin area and included 20 producers with an initial production of 4,399 bbl., or 220 bbl. per well.

Superior 1 H. C. Ford-C, NE SW SE 27-4s-14w, was the best well completed during the week and came in for 1,100 bbl., of which 2 per cent was water. Magnolia 3 E. Cox, SE NW SE 27-4s-14w, was close behind with an initial production of 1,061 bbl., while Pure 2 R. Shinn, E½ SE NW 8-5n-10e, produced 946 bbl. All three wells were completed in the McClosky.

Of the 298 wells carried in current drilling reports, 14 are locations, 26 are rigs, 5 have spudded in, 139 are drilling, 41 are shut down, and 73 are in various stages of completion. Thirteen drilling wells were reported in the Albion field, Edwards County, 33 drilling wells and 16 first reports in White County, and 12 drilling wells and 4 first reports in Hamilton County.

Trenton Tests

The long-debated question regarding Illinois' Trenton possibilities may be answered soon, as Paul Rossi has announced the deepening of his Devonian well, 8 Brooks, SW NE SW 29-2n-2e, to the Trenton. Should this operation be successful, there would undoubtedly be a recurrence of the drilling boom that followed the discovery of Devonian oil. It is significant that only a year after this boom started, there are many Devonian wells whose production is so small that they could profitably be shut down for deepening, with, probably, the same results in the Trenton.

Borton's Centralia test, 1 Storer, was still reported making 150 to 200 bbl. per day but completion is still delayed. It is reported that the well may soon be put on the pump. The Sandoval test, Martin 1 Robinson, is now deepening after its test of the Trenton at 4,380 ft. and is drilling below 4,425 ft. In Clinton County, Schwartz 1 Schlafly, SE NE SE 3-2n-3w, is abandoned as dry at 3,530 ft., 96 ft. below the top of the Trenton.

Carter 1 R. M. York, SE SE SW 33-7s-8e, which was reported last week as making 148 bbl. oil and 152 bbl. fresh water, has been successfully completed in the Palestine from 1,704-32 ft. It is making 222 bbl. of which 6 per cent is water.

Wildcat Tests

In Perry County, G. H. Blankenship 1 Malinski, NW NW NE 24-4s-2w, is reported making free oil and mud from the Cypress at 1,120-30 ft. after a 20-qt. shot. The well was drilled to the Benoist at 1,338 ft. and plugged back to test a show in the Cypress. If successful, this well will give Perry County its first production. Blankenship 1 Bathon estate, SW SW NE 15-4s-2w, is reported as abandoned while a third wildcat in the county, Thompson Drilling Co. 1 Prusacki, SE NW NE 13-4s-2w, is testing the Benoist topped at 1,293-1,303 ft.

Kilpatrick and Hartshorn 1 Mason Community, SE NW 22-6n-5e, testing production, swabbed and flowed 470 bbl. between 24 and 30 hours. The pay is in the McClosky at 2,489-96 ft., and since this test is 15 miles from nearest production, it is of major importance in the basin.

ILLINOIS COMPLETIONS

Bond County

Arrow Drlg. 4 Spindler Inv. ....SW SW NW 10-6n-2w Pumped 55 bbl. oil and 5 bbl. water, 20-qt. shot, Benoist 1,002-17 ft.

Clark County

B. B. Hartman 1 Fain.....SE NE SW 25-10n-14w Pumped 6 bbl., 90-qt. shot, 1,285-1,352 ft., Carper sand 1,282 ft., T.D. 1,352 ft.

Crawford County

Nelson Bros. 1 First Nat. Bank..NW SW NW 4-8n-12w Dry, Pennsylvanian sand 961-75 ft., T.D. 1,031 ft.

Clay County

Shulman 1 Dehart.....W½ NE SW 10-3n-7e Dry, Glen Dean 2,395 ft., Golconda 2,477 ft., Cypress sand 2,583 ft., T.D. 2,602 ft.

Pure 1 M. A. Brown.....E½ NE SE 4-2n-8e Pumped 157 bbl., 5,000 gal. acid, McClosky 2,960-64 ft., 2,997-3,002 ft., T.D. 3,020 ft.

Edwards County

Noah & Morrison 2 Horton.....NW SW SE 13-2s-10e Pumped 150 bbl., 5,000 gal. acid, McClosky 3,133-42 ft., T.D. 3,224 ft.

Tuesday 1 G. J. Works.....SE NE SE 13-2s-10e Old well drilling deeper from 3,150 ft. to 3,176 ft., flowed 350 bbl., 3,156-70 ft.

Fayette County

Sprout 1 Bartimus.....SE SE SW SW 18-6n-3e Location abandoned.

Zephyr 6 Stevens.....NW SW NE 31-6n-3e Pumped 86 bbl., 5-qt. shot, Cypress 1,614-28 ft.

Fayette County—Louden Field

Carter 1 Hayden Gregg.....NW SW SE 13-8n-3e Pumped 54 bbl. oil and 18 bbl. water, 10-qt. shot, Cypress 1,522-39 ft.

Magnolia 5 S. Clow.....NW SE SW 32-8n-3e Flowed 484 bbl., 10-qt. shot, 1,458-65 ft., 40-qt. shot, 1,511-27 ft., Cypress sand 1,449 ft., Paint Creek 1,501 ft., T.D. 1,529 ft.

Magnolia 24 T. C. Clow.....NW SE NE 5-7n-3e Pumped 280 bbl., 20-qt. shot, 1,431-53 ft., 40-qt. shot, 1,494-1,510 ft., Cypress sand 1,427 ft., Paint Creek stray 1,479 ft., T.D. 1,515 ft.

Texas Co. 14 O. Neathery.....NE SW NE 6-6n-3e Pumped 140 bbl., 15-qt. shot, 1,572-82 ft., Cypress sand 1,561 ft.

Franklin County

Benedum-Trees 3 Chenault.....SE SW SE 27-7s-9e Pumped 225 bbl., 3,000 gal. acid, 3,142-54 ft.

Jasper County

Lain O. & G. 1 C. E. Henry.....SE SW NW 17-6n-11e Pumped 265 bbl., 4,000 gal. acid, McClosky 2,849-53 ft., 2,859-92 ft., T.D. 2,901 ft.

Pure 1 Robins Consol.....E½ SE NE 20-5n-10e Flowed 639 bbl., McClosky, Glen Dean 2,266 ft., Ste. Genevieve 2,752 ft., T.D. 2,815 ft.

Pure 2 R. Shinn.....E½ SE NW 8-5n-10e Flowed 946 bbl., McClosky 2,780-90 ft., 2,800-10 ft., T.D. 2,823 ft.

Jefferson County

Magnolia 1 E. A. Hill.....SW NW SE 22-2s-1e Dry, Glen Dean 1,672 ft., Golconda 1,745 ft., Ste. Genevieve 2,204 ft., McClosky 2,273 ft., 1,500 gal. acid, T.D. 2,317 ft.

T. Harvey 1 Consol. Coal Co.....NW NW SW 9-4s-2e Dry, Glen Dean 2,076 ft., Aux Vases 2,548 ft., Fredonia 2,670 ft., T.D. 2,928 ft.

Hamilton County

Exchange 1 Stelle.....SW NW SE 27-5s-6e Pumped 242 bbl. oil and 5 bbl. water, Benoist 2,945-72 ft.

Exchange 8 Friel-B.....SE NW SE 34-5s-6e Pumped 141 bbl., Benoist 2,934-69 ft.

F. Hinkle et al 3 L. & N. R. R. SE SE NE 34-5s-6e Pumped 65 bbl. oil and 1 bbl. water, 30-qt. shot, Benoist 2,937-65 ft.

McBride 1 C. A. York.....NE SE NE 34-5s-6e Pumped 66 bbl. oil and 15 bbl. water, 15-qt. shot, Benoist 2,959-73 ft.

Mammoth 1 Jackson.....SW SW NW 35-5s-6e Pumped 42 bbl. oil and 19 bbl. water, 10-qt. shot, Benoist 2,943-51½ ft.

Haves 1 V. and R. Hood.....SE NW NW 35-5s-6e Location abandoned.

Marion County

Kingwood 1 Lowe.....W½ SE NW 18-4n-3e Dry, Palestine 1,333 ft., Menard 1,458 ft., Golconda 1,744 ft., Benoist 1,995 ft., Aux Vases 2,054 ft., Ste. Genevieve 2,127 ft., Fredonia 2,166 ft., T.D. 2,237 ft.

Big Four 1 Sherman.....NE NW NW 9-2n-1e Dry, old well drilled deeper from 3,004 ft. to 3,198 ft. (was Trenton test).

P. Jones 1 Fyke.....NE SW NW 32-2n-1e Dry, T.D. 1,200 ft.

Goldberg 1 Frederick.....NE NE SE 36-2n-1e Dry, T.D. 3,527 ft.

Marion County—Salem Field

Kingwood 6 Devore.....NE NW NW 17-1n-2e Old well drilled deeper from 2,126 ft. to 2,297 ft., no increase, P.B. to 2,286 ft., acid, P.B. to 2,095 ft., pumped 15 bbl.

Texas 1 F. Donahue.....N½ NE SW 3-2n-2e Dry, Menard 1,440 ft., Tar Springs 1,518 ft., Golconda 1,835 ft., Benoist 1,990 ft., Aux Vases 2,048 ft., Ste. Genevieve 2,122 ft., St. Louis 2,323 ft., T.D. 2,324 ft.

Ohio 1 R. L. Murray.....SW NW SE 7-1n-2e Tar Springs 1,398 ft., salt-water disposal well, T.D. 1,437 ft.

J. J. Deaner 6 Burg.....NE NW NE 18-1n-2e Pumped 9 bbl. oil and 3 bbl. water, 40-qt. shot, Benoist 1,868-74 ft., 1,000 gal. acid and 40-qt. shot McClosky 2,080-2,120 ft., Chattanooga 3,376 ft., Devonian 3,479 ft., T.D. 3,613 ft., P.B. to 2,250 ft., P.B. to 1,874 ft.

Montgomery County

Thorpe & Grant 2 B. Woods..SW NW NW 32-11n-5w Pumped 7 bbl. oil and 8 bbl. water, 5-qt. shot, 616-20 ft.

Richland County

Pure 2 Wachter Consol.....E½ SW SW 7-4n-10e Flowed 276 bbl., McClosky 2,960-73 ft., T.D. 2,990 ft.

Wabash County

Markham (was Snowden & McSweeney) 1 J. Harness, Jr.....NW SW NE 34-2n-13w Was dry, perf. 2,647-52 ft., initial production 250 bbl., 1,000 gal. acid, T.D. 2,688 ft.

S. Yingling 1 Seiler.....NE SE SE 34-1s-13w Dry, Golconda 2,180 ft., Cypress sand 2,294-2,314 ft., Benoist 2,424-40 ft., Ste. Genevieve 2,568 ft., McClosky 2,668-70 ft., slight show oil, T.D. 2,699 ft.

Continental 7 A. E. Shultz-A.....SW SE SE 8-2s-13w Pumped 66 bbl., 25-qt. shot 2,419-29 ft., 25-qt. shot 2,456-66 ft., Cypress sand 2,414 ft., T.D. 2,466 ft.

Continental 1 F. G. Collins.....NW SE NW 20-2s-13w Pumped 141 bbl., Cypress 2,476 ft., Ste. Genevieve 2,744 ft., T.D. 2,838 ft.

Duncan 1 Schroeder.....SE SW SW 11-3s-14w Dry, Cypress sand 2,553-63 ft., T.D. 2,886 ft.

Longhorn 4 Helm.....NW NW NE 23-3s-14w Pumped and flowed 224 bbl., 4,000 gal. acid, McClosky 2,864-72 ft., T.D. 2,879 ft.

Washington County

Lewis-Lilly 1 Noble.....NW NW SE 31-3s-4w Dry, Menard 590 ft., Glen Dean 717 ft., Golconda 780 ft., Cypress sand 922-26 ft.

Wayne County

McClusky (was Carter) 2 Skelton E½ NE NW 21-2n-8e Old well drilled deeper from 3,030 ft. to 3,039 ft., perf. 2,642-46 ft., pumped 28 bbl. from Cypress and 6 bbl. from McClosky.

Pure 1 Garrison-Reed Consol. ..E½ SW NW 36-2n-7e Pumped 31 bbl. oil and 41 bbl. water, 5,000 gal. acid, McClosky 3,045-54 ft., T.D. 3,085 ft.

Pure 1 E. E. Pitman.....W½ SW SW 36-2n-7e Pumped 209 bbl., 5,000 gal. acid, McClosky 3,017-22 ft., T.D. 3,080 ft.

Pure 3 R. I. Gill.....W½ SW NE 21-2n-8e Pumped 56 bbl., McClosky 2,647-58 ft.

Pure 2 Barth Consol.....E½ NW SE 5-1n-8e Flowed 255 bbl., 5,000 gal. acid, McClosky 3,030-34 ft., T.D. 3,090 ft.

Pure 2 Barth-Hubble Consol.....NW NE SE 5-1n-8e Pumped 19 bbl., 5,000 gal. acid, McClosky 3,024-50 ft., T.D. 3,105 ft.

Pure 1 Gid Miller-B.....E½ SW SE 5-1n-8e Pumped 41 bbl., 5,000 gal. acid, McClosky 3,036-39 ft., T.D. 3,090 ft.

Eason & Wright 1 C. Bright.....N½ NW NE 2-2s-7e Pumped 91 bbl. oil and 100 bbl. water, 3,000 gal. acid, Levias 3,312-24 ft., T.D. 3,340 ft.

Myers 1 B. Cormick.....E½ NE SW 4-2s-7e Pumped 200 bbl., 3,000 gal. acid, 3,244-56 ft., T.D. 3,275 ft.

O'Meara 1 McLin.....NW SW NE 9-2s-7e Pumped 68 bbl. oil and 250 bbl. water, 2,000 gal. acid, McClosky 3,261-68 ft., T.D. 3,301 ft., P.B. to 3,275 ft.

Lavender & French 1 Puckett....NE NE NE 17-3s-8e Dry, Menard 2,540 ft., Golconda 2,940 ft., Aux Vases 3,343 ft., Ste. Genevieve 3,409 ft., T.D. 2,879 ft.

White County

Mabee 1 F. Potter.....SW SW SW 4-4s-14w Pumped 250 bbl. oil and 38 bbl. water, 900 gal. and 2,000 gal. acid, McClosky 2,922-29 ft., 2,937-42 ft., 2,950-55 ft.

Cherry & Kidd 3 C. C. Calvin..SW NE NE 8-4s-14w Pumped 53 bbl., 60-qt. shot, Benoist 2,656-95 ft., T.D. 2,700 ft.

Herndon 2 J. Bond.....NE SW NE 8-4s-14w Pumped 125 bbl., 80-qt. shot, Benoist 2,690-2,708 ft.

Magnolia 2 J. J. Bond.....NE NW SE 8-4s-14w Pumped 288 bbl., 100-qt. shot, Paint Creek 2,669-2,719 ft.

D. & H. Drlg. 1 F. M. Hon-A...SW NW NE 9-4s-14w Old well drilled deeper from 2,746 ft. to 2,869 ft., pumped 240 bbl. oil and 50 bbl. water, Aux Vases 2,844-52 ft., Paint Creek 2,734-46 ft.

Pure 3 G. P. Calvin-B.....SE SW SW 9-4s-14w Pumped 152 bbl., Aux Vases 2,821-51 ft., T.D. 2,853 ft.

Cherry & Kidd 3 W. W. Gray-B..SE NE NE 17-4s-14w Pumped 168 bbl., Aux Vases 2,821-51 ft.

Cherry & Kidd 1 W. W. Gray-E..NE NE NW 17-4s-14w Pumped and flowed 242 bbl., 70-qt. shot, Paint Creek 2,670-94 ft., Benoist 2,647-2,712 ft.

Ryan 1 B. Bramlett-E.....NE NW SE 17-4s-14w Pumped 183 bbl., 60-qt. shot, Benoist 2,686-2,702 ft., T.D. 2,705 ft.

Superior 1 H. C. Ford.....NE NE SE 22-4s-14w Pumped 290 bbl., 7 per cent water, McClosky 2,921-35 ft., Cypress 2,658-70 ft., T.D. 2,948 ft.

Superior 7 Fitton.....SW SW NW 26-4s-14w Pumped 34 bbl. oil and 30 bbl. water, 3,000 gal. acid, McClosky 2,903-07 ft., 2,923-25 ft., 2,952-58 ft.

Magnolia 3 E. Cox.....SE NW SE 27-4s-14w Flowed 1,061 bbl., 3,000 gal. acid, McClosky 2,881-92 ft.

Superior 1 H. C. Ford-C.....NE SW SE 27-4s-14w Flowed 1,100 bbl., 2 per cent water, 5,000 gal. acid, McClosky 2,877-83 ft., 2,931-33 ft., 2,944-50 ft.

Superior 1 H. C. Ford-C.....NE SE SW 27-4s-14w Flowed 650 bbl., 5,000 gal. acid, McClosky 2,879-87 ft., 2,909-10 ft., T.D. 2,945 ft.

Cobb & Briscoe 1 J. Beer.....NE SE SW 9-4s-8e Dry, Menard 2,565 ft., Golconda 2,925 ft., Benoist 3,233 ft., Ste. Genevieve 3,419 ft., T.D. 3,500 ft.

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Extend Wildcat Exploration; Testing at Seminole Strike

By
DAL DALRYMPLE

THE far-flung search for new reserves in Oklahoma was extended in several directions the past week when locations were announced or work was started at outpost tests in several widely separated areas. There already were 66 wildcats listed in 30 counties in the state, in addition to several tests in isolated or stripper areas that are not included in the regular reports. A wildcat in Seminole County is showing as a pool opener and several other tests give promise of opening pools.

Completions of the week totaled 38, including 19 oil wells and 7 gas wells. The Hewitt field in Carter County is the busiest single area in the state, and Okfuskee is the busiest county.

The new wildcats include Gulf Oil Corp. 1 Kreiger, CEL SW 3-2n-5w, south of the Knox field in northern Stephens County. It is on a 3,000-acre block assembled by Gulf after the area had been shot. Phillips Petroleum Co. has a nearby block of leases. The wildcat is scheduled to be drilled to 6,500 ft. Production in the Knox field is from 1,300 ft. to 2,300 ft.

Harper & Turner, Inc., were due to start work at 1 Harper, NW NW SW 17-14-2w, northeast of Edmond in northern Oklahoma County. It is to be a Wilcox sand test. Location is on a seismograph high C. E. Hamilton geologized the area, in which there are several short-time leases.

Work is under way or due to start soon at a trio of wildcats in Payne County. J. E. Crosbie, Inc. 1 Moore, NW NE NW 29-19-2e, west of Stillwater, north of the Ramsey pool and on a seismograph high, was due to be started soon. Roy Starr Oil & Gas Co. 1 State, W½ SW SW 16-20-2e, northwest of Stillwater, also on a seismograph location, was drilling ahead, seeking Wilcox sand. Helmerich & Payne, Inc., and John Koberg 1 Freeman, NW NW SW 2-17-2e, northwest of Perkins and about 10 miles southwest of Stillwater, was drilling ahead, scheduled to go to 5,000 ft. or Wilcox sand.

Burke-Greis Oil Corp. 1 Rose, NW NW NW 10-12-9, is a new test in the recently discovered Mason area in Okfuskee County. It offsets the discovery well, a distillate-gas producer.

Leases on Indian tracts in Love and Okfuskee counties brought the better prices in the sale at the Five Civilized Tribes Agency at Muskogee last week. Carl J. O'Hornett, Tulsa, paid $16.66 an acre for SE SE 30-6s-1e and N½ NW 33-6s-1e, a total of 120 acres, in Love County.

Next highest price of the sale was $16 an acre paid by Deep Rock Oil Corp. for Lot 3 and SE SW 7-13-7, a total of 81.77 acres, in Okfuskee County. Other Okfuskee County tracts were bought by John Dropplemman, Shell, Mid-Continent Petroleum and Ohio Oil. Several Seminole County tracts also were sold at the sale.

Amerada Petroleum Corp. 1 Campbell, N½ SW SW 30-9-6, pool opener in Seminole County, continued to test and clean out after shooting. It found Wilcox sand at 4,220 ft., total depth 4,274 ft., and was shot with 80 qt. Before shooting it averaged 8 bbl. of oil an hour.

OKLAHOMA COMPLETIONS

Caddo County

Cement field: Palmer 3 Sterba, NW NW SW 35-6-10w, Hedlund 5,020 ft., T.D. 5,267 ft., perf. 5,070-5,120 ft., gaged 50,000,000 cu. ft. gas, 1,650 lb. shut-in pressure.
E. L. Martin 1 Walker, SE SW NW SE 3-5-9w, T.D. 3,845 ft., flowed 335 bbl.

Carter County

Ed Cox field: Elliott 1-A Pierce, SE NW NE 22-2s-2w, set 7-in. 801 ft., T.D. 924 ft., pumped 21 bbl.
Fox field: Gulf 7 Lester, C NW NW 35-2s-3w, old well P.B. from 8,142 ft. to 5,363 ft., perf. 5,223-5,323 ft., acidized 10,000 gal., flowed 125 bbl. through tubing.
Healdton field: Shell 47 Tubbee, NW SW NW NW 24-4s-3w, T.D. 555 ft., dry.
Hewitt field: Kyle 7 Dougherty, SE NE SW 17-4s-2w, old well deepened from 2,315 ft. to 2,353 ft., pumped 11 bbl., a 4-bbl. increase.
Gibson & Jennings 4 Mertens, SW NW SE 20-4s-2w, set 7-in. 1,976 ft., T.D. 2,021 ft., pumped 125 bbl.
Gibson & Jennings 6 Walker, NW SE NE 20-4s-2w, sands 1,840 ft., 1,955 ft., 2,249 ft., T.D. 2,306 ft., 7-in. 2,249 ft., gaged 1,500,000 cu. ft. gas, 245 lb. shut-in pressure.
W. F. Turner 3 Stearns, SE SW SW 21-4s-2w, sand 2,218-49 ft., T.D., 7-in. 2,218 ft., perf. 2,130-49 ft., pumped 150 bbl., gas est. at 4,000,000 cu. ft.
W. F. Turner 1-A Ward, NW NW NW 28-4s-2w, set 7-in. 2,228 ft., T.D. 2,272 ft., gaged 6,000,000 cu. ft. gas, 250 lb. shut-in pressure.
W. F. Turner 5 Ward, SW NE NW 28-4s-2w, old well deepened from 2,399 ft. to 2,512 ft., hole filled with water, S.D.
W. F. Turner 6 Ward, NW SW NW 28-4s-2w, T.D. 2,355 ft., S.D.

Comanche County

Wildcat: Stogner 2 Lowe, SE NW NW 7-1n-10w, T.D. 610 ft., dry.
Wildcat: Wynn 1 Meier, SW NE NE 12-1n-11w, T.D. 400 ft., dry.
Lawton area: L. B. Bybee 1-A Gandy, SE SW NW SW 35-2n-11w, T.D. 265 ft., dry.

Lincoln County

Perkins area: Portable Drlg. 1 Kent, NE NE SE 23-17-2e, Hunton 4,490-96 ft., T.D., P.B. to 4,494 ft., 7-in. 4,489 ft., acidized 1,000 gal., pumped 40 bbl. oil and 350 bbl. water.

McClain County

Byars pool: Patsy Oil 2 James, NE NE NE 16-5-3, old well deepened from 3,600 ft. to 3,940 ft., dry.

Marshall County

Isom Springs area: Centorp Oil Corp. 4 Minter, NE SW NW SW 30-7s-6e, T.D. 478 ft., pumped 10 bbl.

Muskogee County

Wildcat: Garrett 1 Thompson, SE SE NW 15-13-17, sand 1,776-82 ft., T.D. 1,942 ft., dry.
Council Hill area: Robinson Oil 7 McKee, NE NE SW 17-13-16, T.D. 2,132 ft., pumped 18 bbl.
Yahola area: T. B. Jackson, Jr., 3-A Rowsey, C NE SW 19-15-16, T.D. 1,266 ft., pumped 8 bbl.

Okfuskee County

Dill field: Shell 1 Curry, SW SW NW 35-12-8, T.D. 3,594 ft., flowed 748 bbl. in 19 hr.
North Baltimore area: Dunn, Miller & Porter 1 Allen, SW SE NE 12-12-11, T.D. 3,495 ft., gaged 5,000,000 cu. ft. gas.

Okmulgee County

Bald Hill field: Swick Oil 1-A Wright, CNL NW SW 22-14-14, T.D. 433 ft., pumped 2 bbl.
J. E. Dow 1-C Monday, NW SE NW NE 33-15-14, T.D. 813 ft., pumped 5 bbl.
Pollyanna area: Eugene Brady 1-A Eubank, NE NE SE 32-16-11, T.D. 2,032 ft., pumped 25 bbl.

Osage County

Avant area: Sinclair Prairie 45 Osage, SE NW NE NE 19-23-12, T.D. 1,672 ft., pumped 10 bbl.
Miscellaneous: Sagamore Oil 410 Osage, S½ SW SW NW 21-28-10, T.D. 810 ft., gaged 1,780,000 cu. ft. gas.

Payne County

Wildcat: H. & H. Oil 1 Linsemeyer, SE SE SW 3-18-4, Misener 3,930 ft., T.D. 3,956 ft., S.D.

Pawnee County

Keystone area: Valley Osage 1-B Blackburn, SW NW NE 22-20-9, sand 2,145-49 ft., T.D., gaged 6,000,000 cu. ft. gas.

Pittsburg County

Quinton field: Public Service 3 Carney, NW SW NW 16-7-18, sandy lime 1,804 ft., T.D. 2,114 ft., shot 1,970-2,080 ft., gaged 1,500,000 cu. ft. gas, 250 lb. R.P.

Pontotoc County

Francis area: Manahan 1 Blankenship, SE SE SW 26-5-7, Gilcrease 2,275-80 ft., T.D. 2,330 ft., dry.
Conservation area: McKeown 1-A Stringer, NW NW SW 34-5-6, sand 1,218-40 ft., T.D. 1,307 ft., P.B. to 1,270 ft., pumped 10 bbl.
Wildcat: J. G. Catlett et al 1 James, NW NW NE 19-5-4, dolomite 2,864 ft., Wilcox 2,905 ft., T.D. 2,920 ft., dry.

Pottawatomie County

South Konawa area: John Vinson Oil 1 Fidler, SE SE SE 4-5-5, T.D. 2,795 ft., dry.

Seminole County

Cromwell field: Suppes & White 1-A Pinehill, SW SW SE 28-11-8, sand 1,965-75 ft., T.D., dry.
North Wewoka area: Stanolind 2 Aldridge, SE SE NE 32-9-8, Wilcox 4,360 ft., T.D. 4,379 ft., shot 4,359-79 ft., flowed 50 bbl.
West Seminole area: Martin 1 Earls, NE SE NW 33-9-6, old well deepened from 2,575 ft. to 3,032 ft., pumped 15 bbl.

Stephens County

Empire field: Jackson 6-A Wade, NW SE SW 11-2s-8w, set 7-in. 1,510 ft., T.D. 1,530 ft., P.B. to 1,525 ft., shot 1,515-25 ft., pumped 11 bbl.

Tillman County

Frederick area: I. T. I. O. 1 Ash, NW NW SW 6-3s-18w, Canyon 3,130-36 ft., T.D. acidized 250 gal., potential 246 bbl., pumping.

Tulsa County

Jenks area: Theo. Sauter 2-A Coonhead, SE SE NW NE 12-17-12, T.D. 1,337 ft., pumped 5 bbl.

Wagoner County

Bilby area: James Pet. 1 Robson, SW NE NW 22-19-15, T.D. 960 ft., dry.
McCracken area: French Bros. 3 Mobbs, SE NW SE 20-18-17, T.D. 392 ft., pumped 12 bbl.

FIRST REPORTS

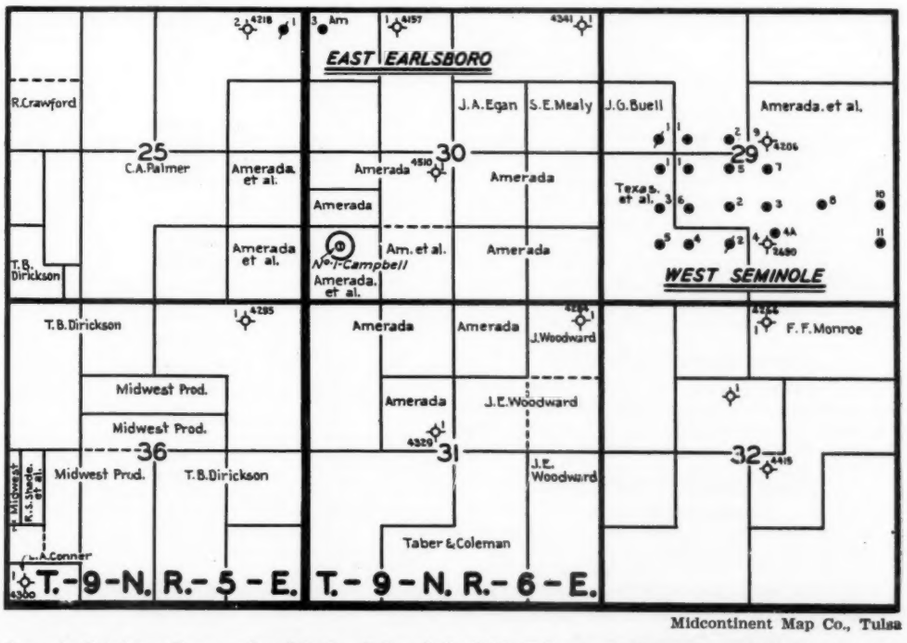
Carter County

Elliott 2 Pierce ..... SW NE NE 22-2s-2w
Gibson & Jennings 6 Griffin .. SE NE SE 20-4s-2w
W. F. Turner 7 Stearns ..... CEL SW SW 21-4s-2w
W. F. Turner 8 Stearns ..... SE SW SW 21-4s-2w

Creek County

Abraham 1-A McIntosh ..... NW NW NE 7-16-10

(Continued on Page 65)



Midcontinent Map Co., Tulsa

Amerada Petroleum Corp. continued testing 1 Campbell, 30-9-6, Wilcox sand discovery south of the East Earlsboro pool and west of the West Seminole pool

By GEORGE WEBER

Location Staked for Second Deep Pine Island Test

SHREVEPORT, La., Nov. 18.—Staking of a second deep test in the Pine Island field of Caddo Parish is noted as the most important development of the week in the tristate area. The test revives interest in an area highly regarded for its deep production possibilities. Several months ago Stanolind Oil & Gas Co. drilled 131 Dillon to a total depth of 11,419 ft., almost 2,500 ft. below the top of the Smackover lime. The test was a failure in the deep horizons, and was completed for a gasser in the Travis Peak formation at 3,950 ft.

Failure of the Stanolind test was a major disappointment to North Louisiana operators, but it is believed that a test drilled down structure on the major uplift might show better productive possibilities. Since large amounts of money were expended in leasing the area for deep exploration, a second test was practically assured. The second deep wildcat, W. G. Ray Drilling Co. 1 Noel estate, C SE 30-21-14, is located about 2½ miles south of the Stanolind test. It will be drilled to a total depth of 8,500 ft. which will carry it into the Cotton Valley formation.

Olla Development Steady

Completions in the Olla field numbered six during the past week, as drilling in the field continues at peak activity. The search for production in the lower Wilcox formation continues in La Salle and neighboring parishes. In La Salle, J. D. Crichett et al 1 Jones has derrick erected on the location 3 miles southeast of the Nebo field. Another wildcat, Delta Drilling Co. 1 Hughes is drilling 6 miles northwest of Nebo.

In Catahoula Parish, Sinclair Prairie Oil Co. has passed the productive zones of the Olla field, and is drilling 1 Peck below 5,960 ft., 2,850 ft. below the top of the Wilcox, in a location 33 miles east of Olla. Northeast of La Salle Parish, H. L. Hunt is 1,300 ft. below the top of the Wilcox, drilling below 3,800 ft. in 3 Chicago Mill & Lumber Co., Franklin Parish.

Of three Grant Parish locations, one, Gholson & Hodge 1 Eberlee near the old abandoned White Sulphur Springs field, 6 miles west of Nebo is rigging up, and a second test, Speir & Nance 1 Armstrong, 2½ miles southeast of the Georgetown field, has surface casing set. The third Grant Parish wildcat, Robert Bowers et al 1 Mathewson, 2 miles east of Georgetown, has derrick erected. To the northeast of Olla, in Caldwell Parish, Gholson & Hodge 1 Louisiana Central Lumber Co. has been staked.

Claiborne Activity

Abandonment of the deepest test in North Louisiana, Ohio 15 Taylor, bottomed at 11,270 ft., reduced interest in Claiborne Parish. The test encountered no production shows in the Travis Peak (Hosston), Cotton Valley or Smackover lime formations. At Lisbon, interest will be revived with the expected resumption of drilling in Caruthers, trustee, 1 Simmons unit, deep test, which showed production possibilities in several deep horizons and has been shut down with a fishing job for several days after an attempted blowout.

Gasser Blows Out in Caddo

Delta Drilling 1 Dunn, NW NE NW 24-17-16, in Caddo County, blew out over the week-end at 2,551 ft., making 15,000,000 cu. ft. of dry gas. At latest reports the well had not been brought under control.

NORTH LOUISIANA COMPLETIONS

Caddo—Caddo Parish

Gulf 270N Caddo Levy Board....SW SW NW 22-20-16
T.D. 2,325 ft., salt water.
L. Habfass 1-B Knight Oil & Land Co.....
NE SE SW 1-21-16
Old T.D. 2,381 ft., P.B. 1,045 ft., salt water.
Stanolind 1-A Lane.....NE SE 13-21-15
T.D. 1,652 ft., pumping 5 bbl., 5½-in. casing 1,625 ft.

Wildcat—Catahoula Parish

Continental 1 Tensas.....N½ SW SW 12-9-7e
Took sidewall cores 3,295-4,812 ft. showed gray salt water sand, T.D. 9,215 ft., abandoned.

Haynesville—Claiborne Parish

Ohio 15 Taylor.....NE SW SE 15-23-8
T.D. 11,270 ft., dry.

Olla—La Salle Parish

Arkansas Fuel Oil 2-B Kees.....NW SE 7-10-3e
75 bbl., heading 5 per cent salt water, T.P. 100 lb., C.P. 480 lb., 7-in. casing 2,240 ft., perf. 2,214-22 ft., T.D. 2,240 ft. upper Central sand.
Arkansas Fuel Oil 1 Ida Mathews..NW SE 26-10-2e
240 bbl., 4 per cent salt water, ¼-in. choke, T.P. 220 lb., C.P. 425 lb., 7-in. casing 2,220 ft., perf. 2,193-2,202 ft., T.D. 2,222 ft. Cruse sand.
Placid 2 A. A. Hopkins.....NW SE 24-10-2e
197 bbl., ¼-in. choke, T.P. 680 lb., C.P. 800 lb., 7-in. casing 2,394 ft., perf. 2,192-98 ft. Cruse sand.
Placid 54 La. Central.....SW SW 25-10-2
144 bbl., 3 per cent salt water, 12/64-in. choke, T.P. 50 lb., C.P. 425 lb., 7-in. casing 2,394 ft., perf. 2,232-42 ft., T.D. 2,394 ft. Cruse sand.
Placid 58 La. Central.....SE SE 35-10-2e
120 bbl., 3 per cent salt water, 16/64-in. choke, T.P. 200 lb., C.P. 525 lb., 7-in. casing 2,440 ft., perf. 2,260-65 ft., T.D. 2,440 ft. Mathews sand.
Placid 59 La. Central.....SW SE 35-10-2
144 bbl., 13 per cent salt water, ¼-in. choke, T.P. 300 lb., C.P. 800 lb., 7-in. casing 2,438 ft., perf. 2,226-36 ft., T.D. 2,438 ft.

Monroe—Morehouse Parish

Southern Carbon 35 Tensas..SE SE NE NE 20-22-4e
T.D. 2,200 ft., 3,000,000 cu. ft. gas, R.P. 920 lb., 6-in. casing 2,105 ft.

Monroe—Union Parish

Nemours Crop. 1 Gardner.....NW NW 14-21-3e
1,500,000 cu. ft. gas, R.P. 930 lb., T.D. 2,200 ft.

Cotton Valley—Webster Parish

Midstate Oil Corp. 1 Giddens unit..SE SW NE 30-21-9
T.D. 8,680 ft., salt water.

NORTH LOUISIANA DRILLING REPORT

Bossier Parish

Ed D'Armand 1 Elgin.....NW SW SE 8-20-13
Top chalk 1,650 ft., drilling shale 2,615 ft., no shows.
Roy L. Reese et al 1 Bellevue Land Co.....
SW SW NE 27-20-11
S.D. 3,035 ft.

Caddo Parish

Caddo-Monarch Gas Co. 1 Crystal fee.....
NE SW SW 23-21-16
T.D. 1,576 ft., tested show of oil.
Delta Drlg. Co. 1 Dunn.....NW NE NW 24-17-16
Coring 2,370 ft.

Catahoula Parish

Sinclair Prairie Oil Co. 1 Peck, 1,200 ft. N, 250 ft. E S cor., irreg. 39-10-8e, drilling sand and shale 5,962 ft.

Claiborne Parish

J. D. Caruthers, Tr. 1 Simmons unit..N½ SW 2-20-5w
(Lisbon deep), fishing 8,689 ft.
V. A. Hardin et al 1 Valentine....NW NW 31-20-6w
T.D. 6,507 ft., S.D.
Union Prod. 1-A Meadows et al.....C NE 18-21-4
Drilling shale and sand 9,367 ft.

De Soto Parish

J. E. Stack et al 1 Cook.....NW NE 32-13-14
S.D. 660 ft.

Franklin Parish

H. L. Hunt 3 Chicago Mill & Lbr. Co..SW SE 35-14-9e
Drilling sand and shale 3,790 ft.

Grant Parish

Gholson & Hodge 1 Eberlee.....NE NE 16-7-1e
Rigging up.
Speir & Nance 1 Armstrong....SW NE NE 27-9n-1e
Set 10-in. casing 37 ft., S.D.

La Salle Parish

J. D. Crichett et al 1 Jones.....NW NW 41-7-3e
Derrick.
Delta Drlg. Co. 1 Hughes.....NE NE SW 22-8-1e
Drilling 2,487 ft.

Red River Parish

Thornton & La Croix 1 Prudential Life Ins. Co.....
SW SW NW 31-11-9
T.D. 1,317 ft., moving in larger rig, arranging to deepen.

Sabine Parish

Roy Raines 1 Carter.....NW NW 27-9-11
Set 6⅝-in. casing 2,025 ft., waiting on cement.

Webster Parish

H. L. Hunt 1 Pardee.....NW SW SE 36-22-10
Top massive anhydrite 4,380 ft., coring 4,926 ft.

Winn Parish

Atlantic 1-D Goodpine.....SW NE 17-10-2w
Rigging up.

NORTH LOUISIANA FIRST REPORTS

Caddo—Caddo Parish

W. C. Curry 3 Spell.....SW SE 28-21-15
Gulf 12 J. H. Herndon.....NW SE SE 15-21-15
Gulf 13 Herndon.....SW NE SE 15-21-15
J. E. Kemp 1 Hobbs.....NW SE NW 28-21-15
J. E. Kemp 2 Hobbs.....NE SE NW 28-21-15

Pine Island—Caddo Parish

W. G. Ray Drlg. Co. 1 Noel est.....C SE 30-21-14

Wildcat—Caldwell Parish

Gholson & Hodge 1 La. Central....NW NE 35-12-3e

Monroe—Morehouse Parish

Hope Prod. Co. 1 Bentley.....NW SW 2-21-5e

Wildcat—Natchitoches Parish

J. E. Watts 1 Tanner.....SW SW NW 18-10-10

Monroe—Ouachita Parish

Carbons Consolidated 2 White....NW NE SE 34-19-3e

Monroe—Union Parish

Carbons Consolidated 1 Haile....NE NW SE 16-21-3e

Cotton Valley—Webster Parish

Hunt Oil Co. 1 Meyer.....NE NE SE 31-21-10

Estimated Daily Production

Estimated daily gross production week ending November 15:

NORTH LOUISIANA

	Bbl.
Bellevue	510
Caddo, light	5,650
Caddo, heavy	2,200
Converse	485
Cotton Valley	*13,195
Cross Lake	3,155
De Soto and Red River	1,005
Elm Grove	335
Haynesville	2,665
Holly	95
Homer	2,775
Lisbon	3,040
Nebo	300
Olla	6,665
Pleasant Hill	85
Rodessa	17,475
Sarepta-Carterville	†265
Sligo	2,360
Sugar Creek	690
Urania	2,325
Zwolle	1,450
Total North Louisiana	66,725
Rodessa, Texas	13,075

SOUTH ARKANSAS

Atlanta	2,500
Big Creek	125
Buckner	1,995
Champagnolle	1,130
Dorcheat	1,150
El Dorado	1,645
Fouke	270
Lewisville	500
Lisbon	210
Magnolia	19,550
McKamie	425
Miller County	255
Nevada	570
Nick Springs	835
Rodessa	1,775
Schuler	16,785
Smackover, light	1,605
Smackover, heavy	13,550
Stephens	555
Troy	1,120
Urbana	1,720
Village	1,015
Total South Arkansas	69,285

*3,600 bbl. is distillate. †40 bbl. is distillate.

EAST TEXAS BORDER

Development of gas properties comprises most of the east border counties' activity at present. The Waskom field is active with two rigs operated by Union Producing Co. and Arkansas Louisiana Gas Co. and another test is staked for the Carthage field, Panola County, by Smith & Turner. The Southern Production Co., subsidiary of Southern Natural Gas Co., is interested in this area and has taken acreage in the Joaquin field, Shelby County, Texas, and De Soto Parish, Louisiana. The company is establishing production to serve a pipe line connecting the area with Monroe, where gas reserves are dwindling.

EAST TEXAS BORDER COMPLETIONS

Wildcat—Bowie County

J. G. Strahan 1 Lewis Fort.....L. Peters Sur.
Dry, T.D. 2,337 ft., P.B. 1,900 ft., perf. 1,961-70 ft., tested salt water, slight show of oil.

Caddo—Marion County

B. & P. Oil Co. 1 Elrod & Grogan.....M. G. Nail Sur.
Pumping 10 bbl., 5½-in. casing 2,325 ft., T.D. 2,347 ft.

(Continued on Page 76)

Importance of Paloma Field Is Increased by New Completion

By
L. P. STOCKMAN

LOS ANGELES, Calif., Nov. 18.—Very little progress has been made in curtailment work in California during the current month to date, although crude-oil production has been averaging about 5,000 bbl. below the same time last month. Overages to date appear to be spread out over the state rather generally but some improvement can be expected later in the month when the Lake View section of the Midway-Sunset field is shut down and operations in other areas are slowed up.

The effect on California of increased purchases of crude oil in the Dutch East Indies by Japan remains to be determined but from a long-range view it would seem probable that it will result in smaller liftings in California and practical elimination of purchases in the Gulf Coast area. For several years Japan has been purchasing considerable crude and refined oil from Bahrein Island in the Persian Gulf to supplement purchases in California, while England made substantial purchases in the Dutch East Indies. The new arrangement will probably result in a switch of markets. The importance of offshore shipments to California operators can not be overemphasized as the leverage provided by shipments to Japan enables marketers to balance supply and demand and thus maintain normal market prices for crude and refined oil.

The outlook for the coming year would be fairly good if it were not for a few disturbing factors that might upset the apple cart again. The situation at Inglewood appears threatening due to deeper drilling, but has not yet reached a serious stage as this work is just getting under way.

Current daily production of leading California fields for the past week follows:

	Barrels
Wilmington	80,400
Milway-Sunset	55,025
Long Beach	43,100
Kettleman North Dome	40,550
Ventura Avenue	34,850
Coalinga	30,050
Huntington Beach	26,950
Santa Fe Springs	25,550
Dominguez	23,450
Santa Maria Valley	20,450

Paloma

Western Gulf Oil Co. completed another excellent flowing well in the Paloma field of Kern County this week when 34-2 Kern County Land in 2-32s-26e was brought in flowing 1,500 bbl. of clean 54.4-gravity oil and approximately 8,000,000 cu. ft. of gas daily. Production is being beaned down in compliance with curtailment and consequently the present gas-oil ratio will be materially changed. This new well, which is located in the eastern end of the field, is bottomed at 10,722 ft. and has a 7-in. water string cemented at 10,282 ft. It is significant to note that this well, which is lower structurally than other wells in the field, has shown a much larger amount of oil sand. Not all of the 440 ft. of productive interval is oil sand, but the amount of oil sand in this interval is larger than expected. It will be noted that production of this well is relatively high and that the crude oil is expectionally high in gravity.

Completion of No. 34-2 Kern County Land of Western Gulf Oil Co. does not change any opinion formed with reference to subsurface conditions as it did not show anything one way or another that had not already been found. The question still remains as to whether the Paloma field of Kern County will contain a normal oil or be limited to production of a high-gravity oil with a high gas-oil ratio. No. 12-12-B Kern County Land, which Western Gulf Oil Co. is drilling about 1 mile southeast of production, should determine the status of the Paloma field. Each succeeding well that Western Gulf has drilled has been away from the apex of the structure in order to ascertain if a normal black oil zone exists, and this is the case with 12-12-B Kern County Land, which the company is drilling in 12-32s-26e.

SAN JOAQUIN VALLEY COMPLETIONS

Coles Levee Field

Standard 20-7 Kern County Land 9-31s-25e
Flowed 534 bbl., 53.5-gravity, 3.2 per cent cut, 6,624,000 cu. ft. gas, 32/64-in. bean. Pressures 600/1,115 lb. Elev. 320 ft. T.D. 9,410 ft. in Stevens sand, 8⅝-in. water string cemented 8,577 ft., 871 ft. 5¾-in. liner landed 9,408 ft., perf. open to production 8,584-9,408 ft., 9,377 ft. 2½-in. tubing, N point 8,266 ft., top Mulinia 3,915 ft., 94 days total elapsed drilling time. Kern County.

Edison Field

Wood-Callahan Oil Co. 1 Lubold 21-30s-29e
Pumped 202 bbl., 18.6-gravity, 5 per cent cut, elev. 523 ft., T.D. 3,563 ft. in Chanas oil zone, 8⅝-in. water string cemented 3,355 ft., 230 ft. 5½-in. liner landed 3,563 ft., perf. open to production 3,358-3,563 ft., 3,360 ft. 2⅛-in. tubing, 28 days total elapsed drilling time. Kern County.

Kern River Field

Hope Oil Co. 4 Gray 8-29s-28e
Pumped 25 bbl., 14.1-gravity, 7 per cent cut, elev. 465 ft., T.D. 1,000 ft., 10¾-in. water string cemented 565 ft., 485 ft. 8⅝-in. liner landed 1,000 ft., perf. open to production 562-1,000 ft., 496 ft. 3-in. tubing, 31 days total elapsed drilling time. Kern County.

Greeley Field

Standard 12-12 Kern County Land 7-29s-26e
Flowed 1,888 bbl., 34.7-gravity, 0.8 per cent cut, 1,640,000 cu. ft. gas, 28/64-in. bean, pressures 1,370/1,490 lb., elev. 344 ft., T.D. 11,510 ft. in Vedder oil sand, 7-in. water string cemented 11,245 ft., 299 ft. 5-in. liner landed 11,509 ft., 60-mesh perf. open to production 11,256-11,509 ft., 11,475 ft. 2⅛-in. tubing, top Rio Bravo oil sand 11,258 ft., top Vedder oil sand 11,288 ft., producing from both Rio Bravo and Vedder zones. Located in northeast part of field; 71 days total elapsed drilling time. Kern County.

Kreyenhagen District

Continental 1 Kreyenhagen 4-22s-16e
T.D. 11,020 ft., abandoned in hard siltstone of Eocene age. Cored hard tight sand at 9,934-61 ft., giving fair cut. Top Avenal zone (Eocene) 9,419 ft., top Kreyenhagen 8,333 ft. Top of Eocene had been expected around 9,200 ft., but Kreyenhagen interval was thicker than anticipated. At top of Kreyenhagen well was 1,500 ft. lower structurally than 1 Mantes of Superior Oil Co. in 6-22s-16e. Believed below Gatchell interval of Eocene age. Fresno County.

Northeast Coalinga Field

Petrol Corp. 43-30-B 30-19s-16e
Flowed 175 bbl., 27.6-gravity, 0.5 per cent cut, 1,000,000 cu. ft. gas, 7/64-in. bean, pressures 1,070/1,100 lb., elev. 676 ft., T.D. 8,288 ft. in Gatchell zone, 7-in. water string cemented at 8,235 ft. 79 ft. 5-in. liner landed 8,288 ft., perf. open to production 8,248-88 ft., 8,255 ft. 2½-in. tubing. Top Kreyenhagen 6,652 ft., top green sand 7,878 ft., top oil sand 8,235 ft.; 62 days total elapsed drilling time. Fresno County.

Round Mountain Field

Trico O. & G. Co. 1-A Westco **8-28s-29e**
Pumped 75 bbl., 16.5-gravity, 3 per cent cut, elev. 792 ft., T.D. 1,452 ft. in Vedder zone, 6⅝-in. water string cemented 1,416 ft., 46 ft. 4¾-in. liner landed 1,450 ft., 80-mesh perf. open to production 1,416-50 ft., 1,304 ft., 2½-in. tubing; 14 days total elapsed drilling time. Top Vedder 1,418 ft. Kern County.

Southeast Coalinga Field

Standard 3-17-F fee 17-20s-16e
Flowed 2,410 bbl., 28.1-gravity, 1 per cent cut, 1,617,000 cu. ft. gas, 44/64-in. bean, pressures 700/950 lb., elev. 754 ft., T.D. 8,135 ft. in Gatchell zone., 7-in. water string cemented 7,795 ft., 377 ft. 5-in. liner landed 8,130 ft., perf. open to production 7,798-8,130 ft., 8,099 ft. 2½-in. tubing including 200 ft. of 2-in. Top Kreyenhagen 6,603 ft., top green sand 7,728 ft., top oil sand 8,129 ft.; 69 days total elapsed drilling time. Fresno County.

Ten Section Field

Shell 25-28-A Kern County Land 29-30s-26e
Flowed 1,591 bbl., 32.6-gravity, 0.1 per cent cut, 1,264,000 cu. ft. gas, open line, pressures 110/900 lb., elev. 338 ft., T.D. 8,220 ft. in Stevens, 8,219 ft., 4½-in. blank casing landed 8,219 ft. and cemented through perf. with 425 sacks cement at 8,023 ft., perf. open to production 8,024-69 ft., 8,109-8,219 ft., 8,008 ft. 2-in. tubing, N point 7,638 ft., top Stevens oil sand 8,026 ft., 37 days total elapsed drilling time. Kern County.

Tupman Field

Richfield 22-33-A Kern County Land 33-30s-25e
Flowed 1,925 bbl., 32.8-gravity, 2.8 per cent cut, 1,700,000 cu. ft. gas, 60/64-in. bean, pressures 400/500 lb., elev. 317 ft., T.D. 9,135 ft. in Stevens, 8⅝-in. water string cemented 8,555 ft., 664 ft. 6⅝-in. liner landed 9,130 ft. and cemented through perf. 8,690 ft., perf. open to production 8,695-8,818 ft., 8,855-9,130 ft., 9,090 ft. 2½-in. tubing; 55 days total elapsed drilling time. Kern County.

SAN JOAQUIN VALLEY OUTPOSTS

Coles Levee Field

Standard 20-8 Kern County Land 5-31s-25e
Rigging up rotary drilling equipment. Kern County.

Kettleman North Dome Field

Standard 344-13-H fee 13-21s-16e
Drilling hard sand and shale 10,680 ft., 6⅝-in. water string cemented 10,674 ft. Fresno County.
Standard 1-1-U fee 1-23s-16e
Drilling hard shale 9,030 ft. Kings County.

Midway-Sunset Field

No. Amer. Oil Consd. 1-28 W.P. 28-32s-23e
Rigged up and preparing to spud. This well, located within proven limits of field, will be drilled as deep test. It is joint undertaking of North American Oil Consolidated, Union Oil Co., Quality Oil Co. and Chanslor-Canfield Midway Oil Co. It is located on Spellacy anticline in which Standard Oil Co. found an oil sand several years ago that failed to produce commercially.

Paloma Field

Western Gulf 12-12-B Kern County Land .. 12-32s-26e
Drilling sandy shale 5,282 ft. Kern County.

Rio Bravo Field

Union 72-28 Crites 28-28s-25e
Drilling sandy shale 10,643 ft. Kern County.
Union 76-27 Kern County Land 27-28s-25e
T.D. 11,576 ft. in barren gray sand. P.B. 8,150 ft. Redrilling 8,250 ft. Kern County.
Union 41-33 Pacific States 33-28s-25e
Location staked and grading for foundation and digging sump. Kern County.

Round Mountain Field

Spartan Drlg. Co. 1 Hiatt 32-28s-29e
T.D. 2,089 ft., sidetracking drill collar and core barrel.

Strand Field

Associated 25-7-E Kern County Land 7-30s-26e
Drilling 10,198 ft. in hard sand and shale. Kern County.

Wasco Field

Pacific Western 1 Meyer 7-27s-24e
T.D. 13,150 ft., bridge 11,105 ft., drilled through 7-in. casing at 10,968 ft., redrilling at 12,430 ft. Kern County.

Wheeler Ridge

Richfield 2 Kern County Land 28-11n-20w
Drilling 10,200 ft. in sand and shale. Kern County.

SAN JOAQUIN VALLEY WILDCATS

Cantua District

Texas 1 Everding 24-17s-15e
T.D. 10,318 ft. in hard tight gray sand and shale of Domengine. Fresno County.

Buena Vista Hills District

Honolulu 25-P fee 10-32s-24e
Drilling 9,961 ft. in hard tight gray shale with streaks of sand, giving no cuts. Kern County.

Pyramid Hills District

Associated 31 West Slope 20-24s-18e
Drilling 1,530 ft., expected oil sand absent. Kings County.

Rio Bravo District

Wilshire 1 Campen 1-29s-25e
Drilling 6,174 ft. in sandy shale. Kern County.

Rumsey Hills District

Standard 1 Tippetts 9-12n-3w
Drilling sandy shale 2,398 ft. Yolo County.

Sacramento District

Ind. Expl. Co. 1 Perry 19-7n-6e
Derrick erected for wildcat approximately 12 mi. SE of Sacramento, the state capital. Sacramento County.

Tejon District

Richfield 1 Tejon Ranch 2-10s-19e
T.D. 8,297 ft., now fishing drill pipe, top 6,860 ft.; now in gray sand and shale. Kern County.

Union Avenue District

Hancock 1 Roberts 6-30s-28e
Finishing rigging up and preparing to spud. Kern County.

Tracy District

Standard 1 Blewett 25-3s-6e
Location staked for this wildcat which will be drilled about 10 mi. SE of Tracy. Early work on schedule. San Joaquin County.

Trico District

Union 1 Seymour 20-24s-23e
Rigging up rotary drilling equipment for immediate work. Will necessitate deep drilling if lower zone becomes objective. Present objective is gas sand. Tulare County.

LOS ANGELES BASIN

The most important development in Los Angeles Basin at the present time is the starting of deep-zone exploitation in the Inglewood field. Deep drilling has been retarded in this field for several years and it had been hoped that nothing would develop to disturb this moratorium but when R. R. Bush Oil Co. stepped out on the south flank of the structure and drilled a deep test it touched off the flame that started work. In addition to 3-1 Los Angeles Investment in

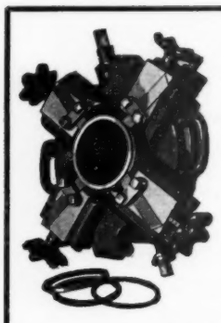
17-2s-14w, a direct offset to 1 Sentous, Standard Oil Co. is drilling 1-86 Los Angeles Investment and has derrick standing for No. 1-85 on the same lease. Kettleman and Inglewood Corp., with a rig standing for 27 Rubel, is drilling ahead in 26 Rubel. Drilling operations in this field may cause some anxiety on the part of other operators as it may become an important factor in curtailment.

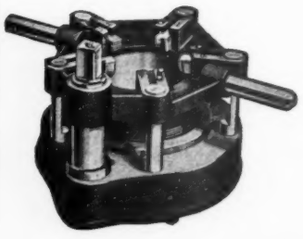
Athens—Rosecrans

The Los Angeles city council this week granted California Petroleum Corp. a zone variance for two wells to be drilled at 123 and Vermont Street in the Athens section of the Rosecrans field and while sufficient time has not yet elapsed since the granting of the permit it is quite likely that derrick construction will get under way within the next 2 or 3 weeks. At the present time there is not a single well drilling in the Athens area despite the fact that a deep zone was proved up in that district several months ago. This lack of enthusiasm reflects the unfavorable production secured in two wells in that district since completion of the deep-zone discovery well.

Long Beach

Union Oil Co. is drilling ahead again in 19 Long Beach Community in the Long Beach field following a delay of several days due to lost circulation. The company had considerable trouble maintaining circulation and resorted to the use of sawdust in the mud as well as other material of this nature. The bit is now rotating ahead at 5,550 ft. This well is scheduled for completion in the deep De Soto zone, which was originally found by De Soto Oil a little above 10,000 ft. Union's present deep well is being drilled because of lease requirements and not by choice inasmuch as the first three wells finished in this zone all showed small production. The De Soto zone was found in December 1938 when De Soto Oil Co. completed its No. 1 flowing 300 bbl. of clean 28.9-gravity oil per day from 10,157 ft. This well was finished with 412 ft. of formation but failed to hold up and the well was later put on the beam.





CUT AND THREAD LARGE PIPE QUICKLY AND EFFICIENTLY

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LOS ANGELES BASIN COMPLETIONS

Huntington Beach Field

Southwest Expl. Co. 11 State 4-6s-11w
Pumped 126 bbl., 19.5-gravity, 15.5 per cent cut, elev. 42 ft., T.D. 4,512 ft., P.B. 4,400 ft., 8⅝-in. water string cemented 4,215 ft., 225 ft. 6⅝-in. liner landed 4,395 ft., perf. open to production 4,207-4,395 ft., 4,185 ft. 2½-in. tubing. Originally completed at 4,512 ft. in April 1939. Well has been bottomed beneath Huntington tidelands under Pacific Ocean by directional drilling. Orange County.

Long Beach Field

Hilldon Oil Co. 4 Flood Control 13-4s-13w
Pumped 25 bbl., 22.4-gravity, 7 per cent cut, elev. 49 ft., T.D. 4,524 ft., solid string of 9-in. casing landed and cemented 4,524 ft., perf. open to production 4,066-73 ft., 4,101-09 ft., 4,118-86 ft., 4,416-33 ft. by gun perforation, 4,440 ft. 2½-in. tubing; 66 days total elapsed drilling time. Los Angeles County.

Rosecrans Field

Kelly & Sons 4 McMillen 19-3s-13w
Flowed 110 bbl., 29.6-gravity, 2 per cent cut, 150,000 cu. ft. gas, elev. 79 ft., T.D. 7,808 ft. in O'Dea zone. 7-in. water string cemented 7,388 ft., 460 ft. 4¾-in. liner landed 7,808 ft. and gun-perf.; perf. open to production 7,388-7,808 ft., 7,800 ft. 2½-in. tubing with packer 7,800 ft. Not showing much kick; 48 days total elapsed drilling time. Los Angeles County.

Wilmington Field

Dunlap Oil Co. 16 Harbor 33-4s-13w
Pumped 81 bbl., 16.2-gravity, 2.5 per cent cut, elev. 29 ft., T.D. 3,143 ft. in Ranger zone, 7-in. water string cemented 3,143 ft., 345 ft. 4¾-in. liner landed 3,467 ft., gravel-packed perf. open to production 3,143-3,467 ft., 3,432 ft. 2½-in. tubing including 358 ft. of 2-in. Located at Pioneer and Opp streets in town-lot area. 15 days total elapsed drilling time. Los Angeles County.

Union Pacific R. R. 160 fee 3-5s-13w
Flowed 910 bbl., 21.9-gravity, 0.2 per cent cut, 110,000 cu. ft. gas, 38/64-in. bean; pressures 150/410 lb., elev. 13 ft., T.D. 2,956 ft. in upper Terminal zone; 7-in. water string cemented 2,704 ft., 352 ft. 4-in. liner landed 2,956 ft., 310 ft. of 60-mesh perf. open to production 2,606-07 ft., 2,627-84 ft., 2,704-2,956 ft. gravel-packed with 202 cu. ft., 2,602 ft. 2½-in. tubing. 16 days total elapsed drilling time. Los Angeles County.

Wilton Oil Co. 7 Comm. 29-4s-13w
Pumped 205 bbl., 16.2-gravity, 6 per cent cut, elev. 48 ft., T.D. 3,710 ft. in Ranger zone, 8⅝-in. water string cemented 3,046 ft., 704 ft. 5¾-in. liner landed 3,710 ft., perf. open to production 3,044-3,130 ft., 3,200-3,350 ft., 3,480-3,710 ft., 3,700 ft. 2½-in. tubing with packer at 2,974 ft. Located in town-lot section of field; 18 days total elapsed drilling time. Los Angeles County.

LOS ANGELES BASIN OUTPOSTS

Dominguez Field

Union 79 Callender 32-3s-13w
Drilling 9,170 ft. A few feet of oil sand cored below eighth Callender zone which at present is deepest producing horizon in field. Los Angeles County.

Long Beach Field

Union 19 L.B.C. 30-4s-12w
Drilling in sand and shale 5,684 ft. Lost circulation several times higher up in hole. Pumped in cement and sawdust. Los Angeles County.

LOS ANGELES BASIN WILDCATS

Castaic District

Pedro Pet. Co. 1 Oates 24-5s-17w
Drilling 2,228 ft. in hard fractured shale. May suspend operations indefinitely. Los Angeles County.

Dominguez-Gardena District

Wood-Mellon 1 Wood 31-3s-13w
T.D. 7,795 ft., P.B. 2,400 ft. Drilled ahead to seventh Callender zone at 6,975 ft., which was barren. Cemented 5½-in. casing 6,975 ft. Will gun-perf. 6,750-6,865 ft. Los Angeles County.

Inglewood District

Standard 3-1 L.A.I. 17-2s-14w
Drilling 5,668 ft. in hard sandy shale. Los Angeles County.

Malibu District

Sovereign Oil Co. 1 Malibu 7-2s-18w
T.D. 3,466 ft. in very hard conglomerate with tight gray sand and streaks of shale. Los Angeles County.

Pico District

Cal-Pico 1 Pico 7-2s-11w
Drilling 7,390 ft. in sand and shale. Los Angeles County.

Whittier District

Fullerton 6 Whittier 25-2s-11w
Drilling 4,486 ft. in sandy shale. Los Angeles County.

COASTAL DISTRICT

The Oxnard district of Ventura County is coming back into the news again as Texas Co. is making plans to drill a wildcat about 6 miles north of the town of Oxnard and 2 miles south of Saticoy in 13-2n-22w. Derrick material is scheduled to be on ground within the next week as grading operations are nearing completion. This district has proved attractive to a number of prospectors over a period of years but, with the exception of Vaca Oil Co., which found an accumulation of heavy tarry oil, wildcat work has been unsuccessful. This will be the third well to be drilled in this general area by Texas Co. The district is covered by an alluvial deposit and surface geology is therefore difficult. The well of the Vaca Oil Co., which found the heavy oil deposit near Oxnard, was

the result of an exploratory survey for minerals undertaken several years ago by Roderick Burnham and others. A resistivity test was run and the reactions aroused suspicions which led to the drilling of a test. A small asphalt plant was erected on the property and it operated for about a year before it burned down. It has not been rebuilt and so the area has remained inactive. There is a definite Miocene high near the property of Vaca Oil Co., although the Miocene at this point is not as thick as elsewhere in the district.

Newhall—Castaic

R. E. Havenstrite, who discovered a new field on the Del Valle anticline a few months ago, has started

(Continued on Page 70)

Oklahoma Fields

(Continued from Page 59)

Grady County

McCasland 1-A Ball.....NW SE SE 21-3n-5w

Jackson County

Burke 7 Minor.....NW SE NE 15-1n-20w

Lincoln County

Howard Berky 3 Gragg.....SE NE SE 32-12-6
Mid-States 2-B Provaznik.....NW SE SW 33-12-6
Underwood 1 Thomas.....C NW SW 10-13-6

Logan County

I. T. I. O. 1 Cronkhite, wildcat..NE SE NW 22-15-4w
Champlin 1 Knecht.....NE NE NW 21-18-4w
Danciger 1 Knecht.....SE SE SE 21-18-4w

Okfuskee County

George Pace 1 Key.....NE SE SW 11-11-8
Sunray 1 Replogle.....SE NW SE 35-11-8
Texas 1 Randall.....NE NW NW 8-11-10
Fain Drlg. et al 1 Castle.....NE NW SE 36-13-8
Martin 1-A Parsons.....NE NW NE 28-13-10

Payne County

Joselyn Prod. 1-A Penney.....SW NW SE 25-19-4

Pontotoc County

Eason 1 Duncan.....SW NW SW 26-5-4

Pottawatomie County

Culver et al 3 Waite.....NW SW NE 9-5-5
Andrade 1 Decker.....SE NW SW 16-7-4

Seminole County

Hilton Phillips 1 Thorn, wildcat....NW NE NE 3-7-5
Hilton Phillips 1 Horsley.....SW SW SW 17-10-6
Miller 1 Parsons, wildcat.....SW SW NW 29-11-6

Stephens County

Raizen Bros. 17 Brown.....SE NW SE 2-2s-5w
Gulf 1 Krieger, wildcat.....CEL NE SW 3-2n-5w

Estimated Daily Production

Estimated daily production in Oklahoma for the week ended November 16, and for the preceding week, was as follows:

	Barrels	
	Nov. 16	Nov. 9
Allen	5,025	5,050
Billings	6,100	6,150
Burbank	7,000	7,025
South Burbank	7,100	7,150
Balance Osage	16,500	16,750
Blackwell district	3,325	3,375
Bristow-Slick	5,850	5,875
Chandler	1,050	1,100
Crescent	1,725	1,175
Cromwell	2,950	2,975
Cushing-Shamrock	8,900	8,975
Duncan	3,525	3,550
Edmond	3,900	3,975
Fish	3,000	3,000
Fitts	14,600	15,000
Jesse	2,025	2,075
Graham-Fox	2,250	2,275
Gray	850	875
Healdton	8,525	8,525
Hewitt	5,300	5,325
Keokuk	2,800	2,800
Konawa	1,000	1,025
Lucien	6,900	6,975
Moore	1,200	1,275
Northeastern counties	17,150	17,500
Oklahoma City	97,150	89,550
Olympic	1,850	1,900
Ramsey	3,600	3,650
Sasakwa	1,450	1,475
Sholem-Alechem	2,550	2,600
Seminole district:		
Bowlegs	6,600	6,650
Carr City	2,125	2,175
Dora	1,800	1,850
Earlsboro	4,075	4,100
East Earlsboro	1,700	1,725
South Earlsboro	500	500
Little River	6,425	6,475
East Little River	625	650
Maud	500	525
Mission	1,200	1,200
Seminole	6,650	6,675
East Seminole	1,050	1,075
Searight	1,950	1,950
Total Seminole	35,200	35,550
St. Louis-Pearson	22,600	22,925
Tatums-Tussy	3,300	3,850
Tonkawa-Garber-Thomas	3,500	3,550
Wewoka	1,550	1,550
Yale-Jennings	2,900	2,950
Other pools	81,775	82,850
Total Oklahoma	396,475	392,825

WILDCAT DRILLING REPORT

Caddo County

Ray Stephens 1 Lankford ..... SE SE NW 6-6-9w
Drilling 2,640 ft.

Cotton County

E. R. Stewart 1 Emery ..... NE cor. 30-3s-12w
Old T.D. 2,503 ft., drilling 3,470 ft.

Creek County

Irvin Drlg. 1 Bailey ..... SE NE SE 1-18-9
T.D. 2,321 ft., drilling by tools.

Hughes County

Ed Scruggs 2 Black ..... NW NE NE 13-9-10
Drilling 360 ft.
Don Feagin et al 1 Fulks ..... NE NW SW 8-9-11
S.D. 2,507 ft.

Kay County

Union Nat. 1 Long ..... NW cor. 29-28-1
Old T.D. 1,670 ft., running 8-in. casing 2,378 ft.

Kiowa County

Artie Baker 1 Coakley ..... NW NE SE 30-7-17w
Drilling 963 ft.

Logan County

Big Chief 1 Strange ..... C SW SE 27-18-4w
Drilling 3,575 ft.

Okfuskee County

Portable Drlg. 1-A Nelson ..... NE SE SW 1-11-9
Drilling 2,895 ft.
W. B. Pine 1 Armstrong ..... SE SE NE 3-11-10
T.D. 3,380 ft., flowed 25 bbl. oil in 10 minutes and died, to P.B.
Davon Oil 1 Sporleder ..... C SW NW 35-12-9
T.D. 3,978 ft., drilled plug at 3,973 ft. and received water, to P.B.

Osage County

Brookhaven Oil 1 Osage ..... NE NE SW 6-22-8
Drilling 789 ft.
Oklahoma Nat. 1 Osage ..... NW NW NE 29-22-12
Bartlesville 1,380 ft., set casing 1,432 ft.

Payne County

Helmerich & Payne 1 Freeman .... NW NW SW 2-17-2
Drilling 1,067 ft.
Roy Star 1 State ..... C W½ SW SW 16-20-2
Drilling 1,737 ft.

Pottawatomie County

J. F. Smith 1 Maud ..... SE SW SE 27-8-5
Drilling 4,461 ft.
Vierson 1 Meyers ..... SE NE NE 1-11-6
Oswego 2,810 ft., drilling 3,030 ft.

Seminole County

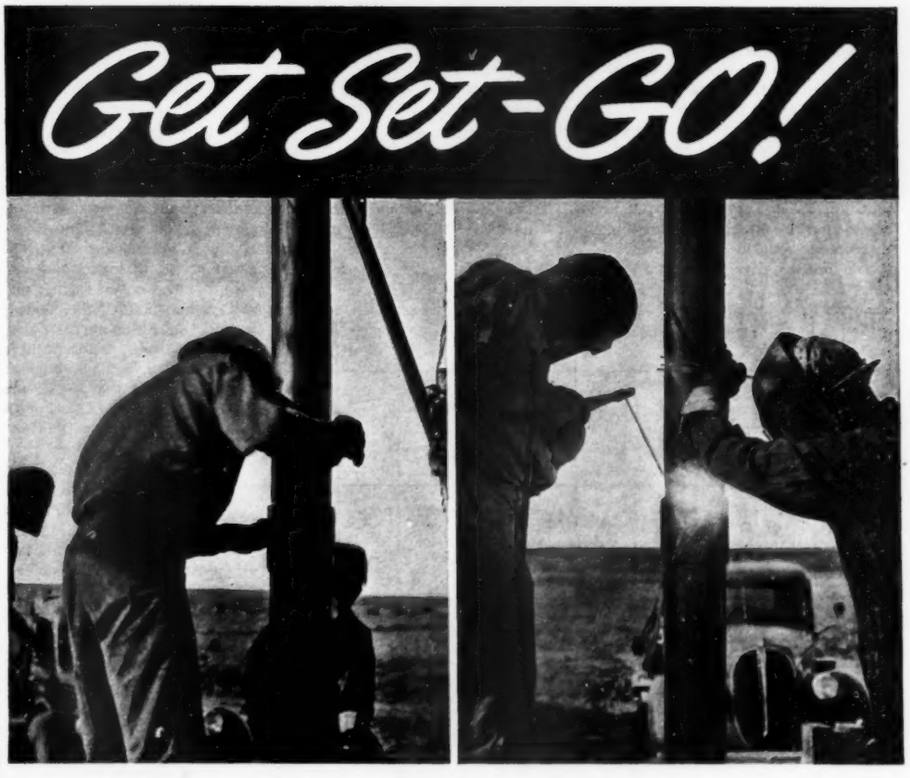
Alma Oil 1 Borden ..... NE SE NW 4-8-8
Drilling 150 ft.
Amerada 1 Campbell ..... N½ SW SW 30-9-6
Dolomite 4,195 ft., first Wilcox 4,220 ft., top pay 4,233 ft., at 4,240 ft. swabbed 54 bbl. oil in 5 hr., 4,269 ft. swabbed 65 bbl. in 5 hr., drilling ahead.

Stephens County

Pace et al 1 Miller ..... NW NE NW 13-3s-5w
Set 7-in. casing 960 ft.

Woods County

Gulf 1 Hess ..... C NE NW 33-23-13w
Drilling 5,765 ft.



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By

R. MARNE SANFORD

Active Drilling Campaign in Area North of Goldsmith

MIDLAND, Tex., Nov. 18. — During the past few weeks both a new oil discovery and a new gas discovery have been recorded in extreme southern Andrews County. As the past week closed there were a total of four wildcats active in the area, two of which were started during the week. The new operations the past week pushed the drilling program south into Ector County and to within only a few miles of the North Goldsmith field and also the large Goldsmith field proper.

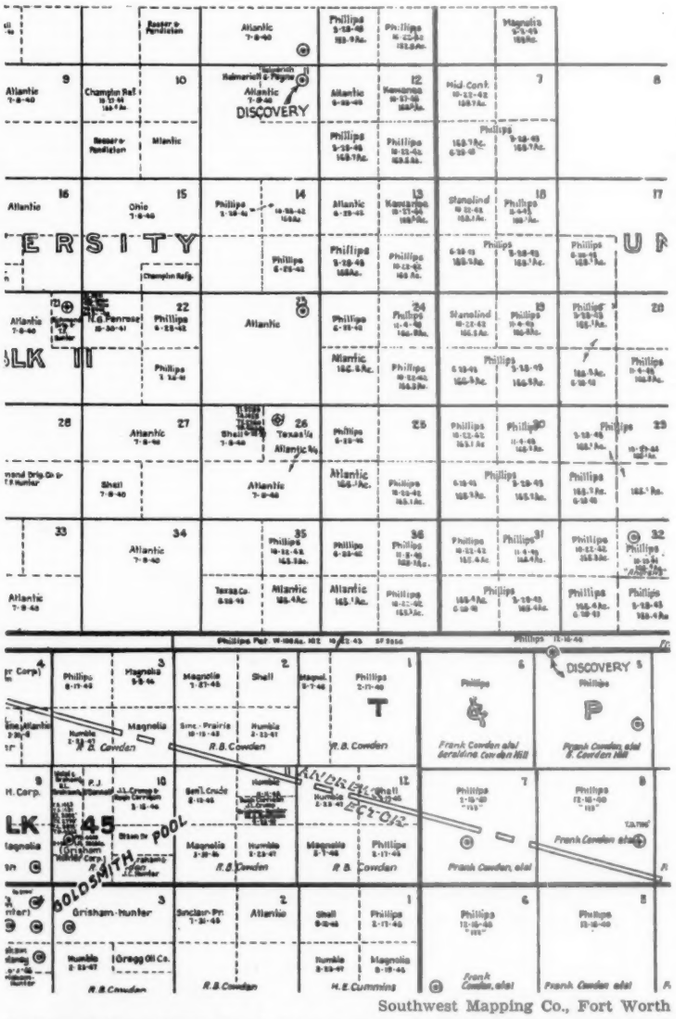
Several weeks ago Phillips Petroleum Co. completed 1 Embar, extreme NW cor. Section 5, Block 44, Township 2n, T.&P. Survey, for 1,805,000 cu. ft. of gas daily to open a new field. The discovery well could possibly have made an oil producer, according to company officials; however the gas was needed for drilling of other wildcats planned in the area. At the time of the completion the company had three other wildcats drilling. One of these, 1-120 Embar, Section 8, Block 44, Township 2n, T.&P. Survey, was quit at 1,705 ft. the past week after it checked considerably low to the discovery well 1¾ miles to the northwest.

The other two operations are both drilling ahead. They are Phillips 2 Embar, Section 5, about ½ mile southeast of the discovery, and 1 University-Drews, Section 32, Block 10, University Survey, about 1½ miles northeast of the discovery.

New operations this week are both in extreme northern Ector County. However, both are on the large Phillips block in the area. Phillips 1-223 Embar ranch (Frank Cowden) is located in the NE NE SW Section 7, Block 44, Township 2n, T.&P. Survey, about 2 miles southwest of the discovery, and 1-222 Embar is about 1½ miles farther south placing it about 3 miles southwest of the discovery. All four of the tests are drilling.

To draw even more attention to the area, the discovery gas well by Phillips Petroleum Co. was only about 5½ miles southeast of a discovery oil producer by Atlantic Refining Co. and Helmerich & Payne several weeks ago. This discovery is located in Section 11, Block 11, University Survey. Since its completion both a north offset and a 2-mile-south outpost have been completed as oil wells. This places the south outpost to the oil-producing area only about 3½ miles northwest of the discovery gas well.

The entire area is on a line with the Harper, Goldsmith and North Goldsmith fields of Ector County, and is on what is called the inside edge of the eastern rim of the Permian basin platform. Production in both of the new areas is from the same Big lime pay found throughout the Permian basin. Early expiration of short-term leases led both Atlantic Refining Co. and Phillips Petroleum Co. to explore the area at the present time.



Southwest Mapping Co., Fort Worth

Southern Andrews County has had two new discoveries during recent weeks, one for gas and the other for oil. Two outposts have been completed in the oil area and during the past week two new locations were made in the gas area which extend the play into northern Ector County and make a total of four active tests in the field

NORTHERN WEST TEXAS COMPLETIONS

Andrews County

Emma field: Osage 5 University, 1,386 bbl., tubing, 3,000 gal. acid, 4,200-86 ft.

Wildcat: Phillips 1-120 Embar, abandoned at 1,705 ft.

Gaines County

Seminole field: Amerada 6 Riley, 833 bbl., ½-in. choke, naturally, 5,040-5,230 ft.

H. W. Bass 3 Austin, 429 bbl., ½-in. choke, 4,500 gal. acid, 5,130-5,239 ft.

Wasson field: Continental 6-49 Wasson, 1,264 bbl., 56/64-in. choke, 12,000 gal. acid, 4,900-5,050 ft.

Hockley County

Slaughter field: Devonian Oil 2 Hudgens, 2,431 bbl., tubing, 11,000 gal. acid, 4,963-5,022 ft.

Magnolia 1-G Mallett, 626 bbl., tubing, 10,-500 gal. acid, 4,945-5,005 ft.

Whittington Bros. 1 R. W. Alewine, 585 bbl., tubing, 13,000 gal. acid, 4,896-4,968 ft.

Yoakum County

Wasson field: Basin States 2 Law & Fisher, 728 bbl., tubing, 10,000 gal. acid, 4,989-5,230 ft.

Don Danvers 5 Willard, 905 bbl., tubing, 10,-000 gal. acid, 5,050-5,252 ft.

Shell 12 Roberts, 432 bbl., ½-in. choke, 10,-000 gal. acid, 5,010-5,205 ft.

NORTHERN WEST TEXAS DRILLING REPORT

Andrews County

Phillips 1-222 Embar, SE SE Sec. 6, Blk. 44, Twp. 1r T.&P. Sur., preparing to drill.

Phillips 1-223 Embar, NE SW Sec. 7, Blk. 44, Twp. 2n, T.&P. Sur., preparing to drill.

Phillips 1 University-Drews, NW NE Sec. 32, Blk. 10, University Lands Sur., drilling 1,645 ft.

Phillips 2 Embar, NE SE Sec. 5, Blk. 44, Twp. 2n, T.&P. Sur., ¾ mile N of Embar, drilling 2,248 ft.

Cochran County

Rhodes and Atlantic 1 Dean, C NE Tract 4, Lge. 89, Lipscomb Co. School Lands lost tools, 5,030 ft., T.D.

Gaines County

Fred Postello 1 Henry James, SE Sec. 368, Blk. G, C.C.S.D.&R.G.N.G. Sur., T.D. 5,231 ft., slight porosity 5,073-92 ft., testing.

Amon G. Carter 4-D Wasson, NW SE Sec. 50, Blk. AX, P.S.L. Sur., 9,000-ft. test, logged new pay about 6,610 ft., tight well, believed drilling about 8,345 ft.

Hockley County

Cascade Pet. 1 Walker, Sec. 22, Lge. 22, McCulloch County School Lands, S.D. 5,103 ft., sulfur water.

Terry County

Gulf 4 Mallett, Sec. 4, Blk. X, P.S.L. Sur., SW of Slaughter field, drilling 5,005 ft.

Sloan & Zook 1 Bailey, Sec. 103, Blk. 4-X, P.S.L. Sur., 4 mi. NE of Wellman, surface casing 232 ft.

Denver Prod. & Ref. 1 Lewis, Sec. 62, Blk. D, Gibson Sur., 3½ mi. S of Wellman, drilling 197 ft.

Yoakum County

Forest Development 1 A. C. Whisenant, SE Sec. 553, Gibson Sur., 1½ mi. N outpost to Waples-Platter area, T.D. 5,500 ft., oil lime 5,410-85 ft., 5½-in. liner set from 4,454-5,515 ft., bailed 14 bbl. salt water daily, still testing.

SOUTHERN WEST TEXAS

The completion of Pecos County's discovery Simpson lime (Ordovician) oil producer, together with a new location for the area, highlighted the news of the southern part of West Texas. Taubert-McKee-Siemoneit Drilling Co. 1 V. W. Crockett, Section 4½, Block 3, H.&T.C. Survey, was completed for 933 bbl. of oil, flowing through ½-in. choke, in 11⅔ hours. This is at the rate of approximately 1,866 bbl. daily. The pay section was the Simpson lime of Upper Ordovician and was from 5,270 to 5,357 ft. The well reported top of the brown lime at 1,170 ft., Yates at 1,240 ft., Simpson at 4,755 ft.

The new location for the area was by Magnolia and is 1 Markey heirs, ½ mile northwest of the discovery well. The site is 2,400 ft. from the north line and 1,200 ft. from the west line of Section 4½, Block 3, H.&T.C. Survey, and will be started immediately.

Winkler County

A new producer was indicated in the area opened recently by Gulf Oil Corp. between the O'Brien and the Halley fields in Winkler County. The discovery well was Gulf 130 O'Brien and the new indicated producer is about ½ mile to the east. It is Gulf 147 O'Brien, Section 11, Block F, G.&M.M.B.&A. Survey. Late in the week the well began heading oil at the rate of about 35 bbl. daily while drilling below 2,762 ft. Increases were found to 2,832 ft. and at 2,840 ft. the well started heading three times daily. Whether the company will attempt completion from this depth or will carry the well slightly deeper was not reported.

SOUTHERN WEST TEXAS COMPLETIONS

Crane County

Jordan field: R. B. George 2 University, 508 bbl., tubing, natural, 3,105-21 ft.

Tubb field: Humble 45 Tubb, 2,311 bbl., tubing, 1,000 gal. acid, 4,270-4,450 ft.

Ector County

Johnson field: Atlantic 3 Johnson, 963 bbl., 1-in. choke, 320-qt. shot, 4,080-4,150 ft.

Foster field: Broderick & Calvert 3 Bagley, 875 bbl., tubing, 340-qt. shot, 4,170-4,314 ft.

North Goldsmith field: Grisham-Hunter 2 Cowden, 89 bbl., tubing, 5,000 gal. acid, 4,239-4,530 ft.

Pecos County

White & Baker field: Cardinal Oil 1-F White & Baker, 76,000,000 cu. ft. gas, 1,692-1,763 ft.

Fromme field: W. H. Street 4 Fromme, 243 bbl., tubing, 50-qt. shot, 1,467-1,500 ft.

Wildcat discovery: Taubert-McKee-Siemoneit 1 Crockett, 933 bbl. in 11⅔ hr., ½-in. choke, 5,270-5,357 ft.

(Continued on Page 80)

By
DAL DALRYMPLE

Ohio Buys Pawnee Holdings In Forest City Basin

ST. JOSEPH, Mo., Nov. 18.—Sale of the Pawnee Royalty Co.'s holdings in the Forest City basin to Ohio Oil Co. was confirmed the past week. The Ohio company acquired nine oil wells in the Falls City pool and leased acreage in Richardson and Nemaha counties, Nebraska, and Brown County, Kansas. The lease block covers approximately 65,000 acres. The sale price was not divulged, but it was understood that a large sum of cash was paid with the Pawnee company retaining an over-riding royalty.

The Pawnee company is headed by W. A. and B. G. Guinn, brothers, with headquarters at Odessa, Tex. They entered the Forest City basin lease boom about 2 years ago, assembled their block, had it geologized and seismographed, and started their first wildcat near Falls City, Neb. It proved to be the discovery of the first oil pool definitely in the basin and the first in Nebraska. Later they qualified for the Nebraska bonus of $15,000 for the first well in the state to produce as much as 50 bbl. daily for 60 days. Albert Ladner, geologist, and Brick Eidson, lease man, were associated with the Guinn brothers.

About the time the sale was being completed, the Pawnee company completed its 3 Bucholz, S½ SW 17-1n-16e, Falls City pool. Drilled to 2,225 ft. in Hunton lime topped at 2,208 ft., it checked higher than any other well in the field. It was acidized with 650 gal. and flowed 650 bbl. daily.

In recent weeks the Guinn brothers drilled 2 Bucholz, C NW NW 17-1n-16e, to Viola lime, topped at 2,925 ft., and set pipe for a test. The Ohio Oil Co. is expected to test that formation, but probably will drill necessary offset wells to Hunton lime before doing so. If the Viola horizon is proven productive, as many observers believe it will be eventually, it will give the Nebraska area its third producing horizon. Hunton lime is the main pay, with some oil having been found in Misener sand.

Elsewhere in the Falls City pool, R. L. Campbell was preparing to drill his fourth well, 2 Schock, SW SE SW 20-1n-16e. Drill pipe remained stuck in Skelly Oil Co. 1 Prichard, C SE NE 29-1n-16e, and the company's 3 Davisson, SE NW NE 20-1n-16e, was looking for Hunton lime. E. J. Shaffer has been having trouble with his 1 and 2 Sandrock wells. The 1 Sandrock, NE SW NW 20-1n-16e, began producing more water than oil and a squeeze job was tried. The No. 2 probably will be given the same treatment. His 3 Sandrock, NW SW NW 20-1n-16e, topped Hunton at 2,260 ft. and ran pipe. Elevation is 899 ft.

E. W. Shrock et al 1 Rogge, NW NW NW 17-5n-15e, Nemaha County wildcat, was reported dry at 2,472 ft., total depth. Casing was perforated at 2,306-2,316 ft., but there was only a small amount of oil showing.

J. E. Palanski 1 Dohlke, C NE NE 14-3n-12e, Pawnee County, found conglomerate and granite wash at 665 ft. and had granite at 710-15 ft., having struck the Nemaha ridge. This was a farmout from Jackson & Rust.

NEBRASKA WILDCAT REPORTS

Cass County

Golden Rod 1 Sporrer.....SE cor. 8-11-13
Drilling 1,265 ft., last report.

Furnas County

Trickett & Atkins 1 Gossic.....NW cor. 33-2-21w
S.D. 742 ft.

Keith County

Keyes et al 1 Haythorn.....C SW 27-16-39w
S.D. 810 ft.

Lancaster County

August Krueger 1 Roe.....SE SW SW 5-7-7
Drilling 720 ft., last report.

Nemaha County

Palanski et al 1 Dolhke.....C NE NE 14-3-12
Lansing 451 ft., granite 710-15 ft., T.D., waiting orders.
Frank Engles et al 1 Wheeler.....NE cor. 9-4-14
S.D. 2,388 ft.
Turner & Leiker 1 Kiechel.....NE NE SE 4-5-13
Location.
Bow & Arrow Oil 1 Shriefer....C N½ NE SW 20-5-14
S.D. 2,000 ft.
Ray Pulliam et al 1 Lawrence.....SE cor. 35-5-15
Lansing 769 ft., Mississippi 2,010 ft., fishing 2,070 ft.
Bow & Arrow Oil 1 Wrightsman C W½ SW NW 36-6-14
S.D. 800 ft.
Ellis Bros. 1 Armstrong.....C SW NE 10-6-15
Location.

Richardson County

Uhri Oil 1 Stauffer.....SW SW NE 22-1-13
S.D. 1,605 ft.
Eckhart et al 1 Ast.....SW SW NW 6-1-14
Drilling 1,400 ft., last report.
Uhri Oil 1 Wittwer.....NE SE SW 8-1-14
S.D. 74 ft.
Uhri Oil 1 Ogle.....NW SE SE 9-1-14
T.D. 2,260 ft., pumped 300 bbl. fluid in 8 hr., est. 98 per cent water.
Forest City Basin Synd. 1 Windle-Dodge.....
SE NE SE 3-1-15
S.D. at T.D. 2,605 ft., H.F.W.
R. McIntyre et al 1 Hough-Hill.....C SE SW 6-1-16
Underreaming 8-in. casing 1,800 ft.

NEBRASKA FIRST REPORTS

Richardson County

I. T. I. O. 1 Last, wildcat.....C NE SE 19-3n-16e
R. L. Campbell 2 Schock.....SW SE SW 20-1n-16e
Taylor et al 1 Walmsley.....C SW NW 8-1n-16e

Nemaha County, Wildcats

Clampitt et al 1 Roberts.....SW SW NE 31-4n-6e
Turner & Leiker 1 Kiechel.....NE NE SE 4-5-13e
Ellis Bros. et al 1 Armstrong....C SW NE 10-6n-15e

Operations in Missouri

In Atchison County, Missouri, Jackson & Rust were building rotary rig at 1 Hays, C NE NE 22-66-42w, in the extreme northwest corner of the state and about 30 miles north of Falls City, Neb. It is to be a Hunton lime test. Ohio Oil Co. is core drilling in neighboring Holt County.

American Oil & Gas Co. 1 Thompson, SW SW 30-58-31w, DeKalb County, went into St. Peter sand at 2,126 ft.

In Caldwell County, O. M. Evans 3 Leamer & Ivey, SE cor. 31-55n-28w, was dry at 440 ft., total depth. His 1 McCullough, C SW NW 33-55-28w, was being drilled.

In Bates County, John Eger 1 Midkiff, Section 13-38-29w, wildcat, was making hole below 770 ft. when last reported.

In the Kansas sector of the Forest City basin, it was reported Dan McLaughlin of Des Moines and the Cities Service Co. had made a deal for the company to take 10 per cent of gas production in the McLouth pool, Jefferson County, and McLaughlin would lay a 6-in. line from the pool to Tonganoxie to connect with the company's main line.

MISSOURI WILDCATS

Atchison County

Jackson & Rust 1 Hays..... C NE NE 22-66-42w
Cellar and pits.

De Kalb County

American O. & G. 1 Thompson C SW SW 30-58-31w
Viola 1,915 ft., drilling 2,118 ft.

IOWA WILDCATS

Taylor County

Smythe et al 1 Hook.....C NE NW 18-69-35w
Fishing 1,100 ft.

Fremont County

J. A. Johnson et al 1 Lucas....SW NE SE 28-70-43w
Location.

KANSAS OPERATIONS

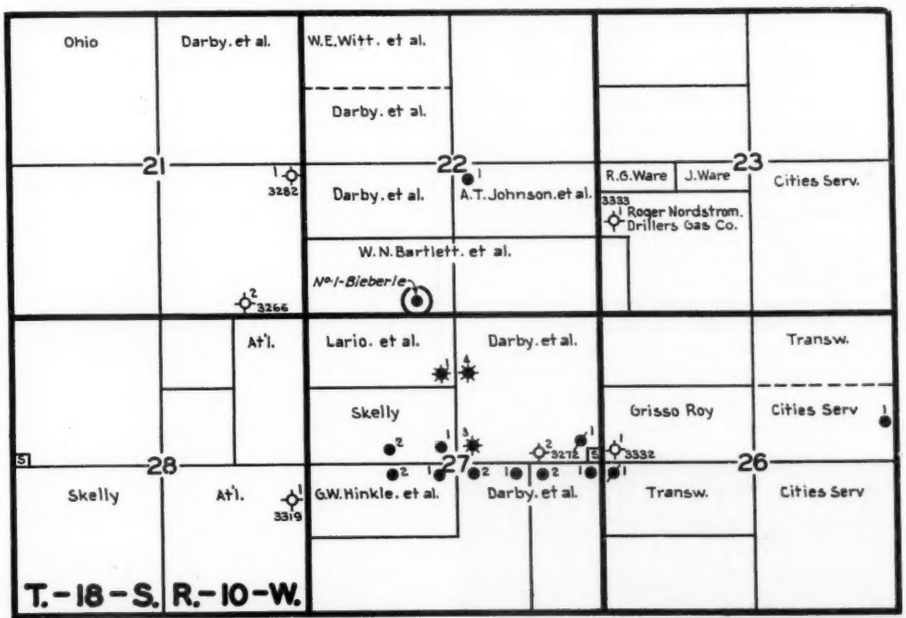
WICHITA, Kans., Nov. 18.—Field activity in Kansas was slowed up last week by cold weather, but several new wildcats were announced and one discovery well was completed. Thirty-eight wells were completed.

The discovery well was F. S. Williams et al 1 Henne, SW SW NE 21-17-1w, near Roxbury, McPherson County. It topped chat at 2,648 ft., total depth 2,662 ft., was acidized with 2,000 gal., pumped 165 bbl. in 8 hours and made potential of 495 bbl. The new area has been named the East Roxbury pool.

Work was reported underway at C. E. Olsson 1 Anderson, NW SW SW 1-7s-8e, wildcat in Pottawatomie County. It is about 60 miles southwest of the Falls City, Neb., pool and on the opposite side of the Nemaha ridge, and about 72 miles northeast of the Lost Springs pool in Marion County. It is between the Nemaha ridge and the Abilene anticline. Location is on a block reported to cover 27,000 acres. Contract depth is 4,000 ft.

Basinger & Fowler 1 Janssen, NE NE SE 9-21-3e, is a new wildcat 4 miles north of Peabody, Marion County. Cable tools were being rigged up for a 3,000-ft. or Arbuckle lime test. Location is on a 3,000-acre block. Nearest production is in the Covert-Sellars pool, about 4½ miles eastward.

Central Petroleum Co. started work at 1 Wellbrook,



Midcontinent Map Co., Tulsa

The Orth pool was extended northward at W. N. Bartlett et al 1 Bieberle, 22-18-10w, Rice County. Production is from quartzite at 3,223 ft. It pumped 72 bbl. of oil on preliminary tests

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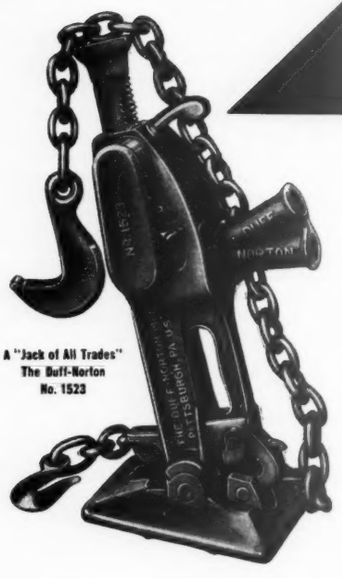

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NW NW NE 32-14-16w, wildcat 5 miles south of the Hartsook pool, Ellis County. It is on a Cities Service farmout. The test is reported to be supported by Lion Oil Refining Co., El Dorado, Ark., and Alder Oil Co., New York.

COMPLETIONS IN KANSAS

Barton County

Wildcat: Continental 1 Borger, NW SW NE 33-16-14w. Lansing 3,246 ft., Sooy 3,455 ft., Arbuckle 3,495 ft., T.D. 3,518 ft., dry.

Kraft field: Texas 1-B Burmeister, W½ NW SE 2-17-11w. T.D. 3,384 ft., potential 1,790 bbl.

Texas 5 Disque, NW SE SW 3-17-11w. T.D. 3,362 ft., potential 927 bbl.

Trapp field: Shell 3 Peterman, SE SE SE 13-16-14w. T.D. 3,410 ft., pumped 126 bbl.

Otis field: E. R. Rabon et al 1 Anderson, N½ NE NW 32-18-15w. T.D. 3,514 ft., gaged 5,328,000 cu. ft. gas.

Ainsworth pool: Aladdin Pet. 4 Linsner, NE NW SE 3-17-13w. T.D. 3,400 ft. in Arbuckle, pumped 100 bbl.

Silica field: I. T. I. O. 2 Reiser, CSL SE NW 23-20-11w. T.D. 3,303 ft. in Arbuckle, acidized, potential 1,424 bbl., calculated.

Butler County

Douglas pool: Plymate & Barnholdt 1-A Graves, SW SE NW 17-29-4. T.D. 2,317 ft., dry.

Miscellaneous: Bennett & Abels 1 Lindley, SW SE SW 6-27-7. Kansas City lime 2,182 ft., T.D. 2,192 ft., pumped 50 bbl.

Rex & Morris 3 Farmer, NW SW NW 8-28-7. Bartlesville 2,621 ft., T.D. 2,658 ft., shot with 170 qt., pumped 30 bbl.

Ellis County

Wildcat: Lario O. & G. 1-A Patter, W½ NW SW 20-11-16w. Lansing 3,065 ft., base Kansas City 3,325 ft., Sooy 3,360 ft., Arbuckle 3,560-66 ft., T.D., dry.

Bemis field: Cities Service 2-B Collahan, NE NW NW 25-11-17w. T.D. 3,576 ft., potential 2,735 ft.

Cities Service 5 McCord, NW SW NE 26-11-17w. T.D. 3,691 ft., dry.

Champlin 3-D Hadley, C SW SE 20-11-17w. T.D. 3,607 ft., acidized, pumped 50 bbl.

Ellsworth County

Lorraine field: Vickers Pet. 1 Janssen, SW SW NW 13-17-9w. T.D. 3,079 ft. in Arbuckle, retested, potential 50 bbl.

Stoltenberg field: Lauck & Moncrief 6 Ehler, CNL S½ NW 35-16-10w. T.D. 3,288 ft. in Arbuckle, pumped 50 bbl., temporary minimum allowable.

W. C. Emerich 1 Schroeder, E½ SE NW 28-16-10w. Pumped 96 bbl. daily, temporary minimum allowable, from Arbuckle lime.

Aylward Production 2 Boye, E½ NW SW 9-16-10w. T.D. 3,346 ft., pumped 141 bbl. from Arbuckle, temporary potential.

Pryor & Lockhart 6 Stratman, N½ SW NW 1-17-10w. T.D. 3,306 ft. in Arbuckle, pumped 159 bbl., minimum allowable.

Grant County

Hugoton field: Columbian Fuel 1 Hampton, SE SE NW 32-28-36w. T.D. 2,764 ft. in Permian lime, shot with 120 qt., acidized with 12,000 gal., gaged 11,281,000 cu. ft. gas.

Greenwood County

Severy pool: J. E. and R. L. Brinegar 1 Hasty, SE NE NW 17-28-11. T.D. 1,234 ft., pumped 17 bbl.

McPherson County

Bornholdt field: Republic Natural Gas 2 Johnson, E½ SW NW 19-20-5w. T.D. 3,317 ft., potential 3,000 bbl. from chat, calculated.

Tulsa Oil Corp. 4 Nelson, CNL NW NE 19-20-5w. T.D. 3,341 ft. in chat, pumped 50 bbl., temporary minimum potential.

Roxbury pool: Hammer & McLean et al 1 Henne, SW SW NE 21-17-1w. T.D. 2,662 ft. in chat, pumped 495 bbl.

Marion County

Lost Springs pool: H. L. M. Oil 1 Shields, S½ SE SE 19-17-4. T.D. 2,493 ft., dry.

Phillips County

Wildcat: Gulf 1 Houghton, S½ SW NW 10-4-19w. Anhydrite 1,505 ft., Fort Riley 2,130 ft., Neva 2,456 ft., Topeka 2,967 ft., Oswego 3,197 ft., conglomerate 3,516 ft., Arbuckle 3,526-75 ft., T.D., dry.

Pratt County

Wildcat: Marylyn Oil et al 1 Jackson, E½ NE NW 1-27-13w, Simpson 4,201 ft., Arbuckle 4,315 ft., T.D. 4,342 ft., shut down.

Rice County

Wildcat: C. L. Carlock et al 1 Karber, W½ NW NW 7-19-10w, discovery well in the Karber pool, 1 mile east of the Rick pool in Barton County. Arbuckle 3,343-50 ft., T.D., acidized with 3,000 gal., pumped 280 bbl. of 34-gravity oil daily.

Geneseo field: Continental et al 5 Ainsworth, NE NW SE 24-18-8w. T.D. 3,180 ft. in Arbuckle, potential 3,000 bbl., calculated.

Keesling pool: Colorado Pet. 1-B Keesling, W½ NW NE 10-20-9w. T.D. 3,232 ft. in Arbuckle, swabbed 45 bbl.

Lyons pool: Atlantic and Sinclair Prairie 1 Brubaker, S½ S½ NW SE 35-19-8w. T.D. 3,305 ft., gaged 8,787,000 cu. ft. gas.

Rooks County

Laton pool: Cooperative Pipe Line 3 Beardmore, W½ SE NE 10-9-16w. T.D. 3,218 ft., potential 2,385 ft., calculated.

Krueger Oil 2 Tatenhorst, S½ NW SE 10-9-16w. T.D. 3,228 ft., potential 3,000 bbl., calculated.

Russell County

Hall-Gurney field: Cities Service 2 Hickey, W½ SW SE 25-14-14w. T.D. 3,214 ft., pumped 525 bbl.

Skelly 15 Opdycke, S½ SW NW 32-14-13w. T.D. 2,942 ft., potential 1,195 bbl., pumping.

Trapp field: Coralena Oil 2 Bitter, N½ NE NW 16-15-13w. T.D. 3,088 ft., potential 2,460 bbl., pumping.

Stafford County

Zenith field: Transwestern 2-D Banker, W½ SW SE 10-24-11w. T.D. 3,829 ft. in Misener, potential 3,000 bbl., calculated.

Stanolind 4 McComb, N½ NW SW 12-24-11w. T.D. 3,785 ft. in Misener, acidized, potential 3,000 bbl., calculated.

Cowley County

South David pool: Derby Oil 3 David, E½ SW NE 2-31-4. T.D. 2,968 ft., pumped 50 bbl.

WILDCAT REPORTS

Barber County

Barbara Oil 1 Angell ..... C NE SE 10-33-14w
Simpson sand 5,190 ft., S.D. 5,205 ft.

Barton County

Shell 1 Homolka ..... NE NE SE 24-16-11w
Fort Riley 1,670 ft., Florence 1,770 ft., Neva 2,025 ft., drilling 2,205 ft.

Owens et al 1 Burmeister .... C S½ SE NW 20-17-11w
Fort Riley 1,673 ft., Florence 1,770 ft., drilling 2,212 ft.

Cowley County

Wakefield et al 1 Durham .... C W¼ NW SE 34-30-3
Drilling 1,485 ft.

Shell 1 O'Neil ..... NE cor. 27-32-3
Base Mississippi 3,271 ft., Misener 3,419 ft., Arbuckle lime 3,421 ft., oil stains 3,424-34 ft., S.D. 3,465 ft., T.D.

Edwards County

McKnab et al 1 Minet ..... C SW SW 15-25-17w
Topeka 3,470 ft., Lansing 3,982 ft., drilling 4,278 ft.

Ellis County

Stearns Drlg. 1 Witt ..... C S½ NE SW 28-12-16w
Drilling 1,330 ft.

Greenwood County

E. W. Creel 1 Stonebreaker .. C W½ E½ SW 32-27-11
S.D. 1,254 ft.

Ward McGinnis 1 Sharp ..... C SW SW 9-28-12
Drilling 1,690 ft.

Johnson County

McCain, Sherrod et al 1 Doan C E½ NE SE 34-12-22
Old T.D. 1,585 ft., S.D. at 1,585 ft.

Leavenworth County

McLaughlin & Sons 1 Thorp ..... C NE NE 27-10-20
S.D. 850 ft.

Nemaha County

Bumpus & Hibbard 1 Achten .. C S½ SE NW 12-4-14
S.D. 1,890 ft.

Pottawatomie County

Olson & McCole 1 Anderson ..... NW SW NW 1-8-7
Show gas 750 ft., drilling 895 ft.

(Continued on Page 86)

Illinois Fields

(Continued from Page 58)

Tide Water 2 Shain.....SE NW SE 23-6s-8e
Pumped 147 bbl. oil and 10 bbl. water, 3,000 gal. acid, McClosky 3,052-56 ft., 3,077-85 ft.

Exchange 8 L. A. Pearce.....NE SE NE 11-6s-9e
Pumped 200 bbl., 5-qt. shot, Waltersburg 2,266-79 ft

Exchange 7 L. A. Pearce.....NW NE SE 11-6n-9e
Pumped 126 bbl., 5-qt. shot, Waltersburg 2,251-79 ft.

Exchange 9 L. A. Pearce.....SW SW NW 12-6s-9e
Pumped 150 bbl., 5-qt. shot, Waltersburg 2,267-79 ft.

Blackstock 2-B Storms.....NE SW NE 23-6s-9e
Location abandoned.

Carter 1 E. A. Green.....SE NE NW 2-7s-9e
Pumped 15 bbl. oil and 30 bbl. water, 20-qt. shot, 2,324-44 ft., Waltersburg 2,248 ft., Vienna 2,326-31 ft., T.D. 2,351 ft.

ILLINOIS DRILLING REPORT

Bond County

J. Harding 1 Gottfried.....NE NW NE 28-5n-4w
Spud. First report.

Clinton County

Snell & Goldsmith 1 Schaefer. SW NE NW 33-2n-3w
T.D. 2,570 ft., P.B. 2,535 ft., S.D.

Nat. Consumers Oil 1 Fricke....NW SE SW 14-1n-2w
Drilling 825 ft.

Crawford County

Fuller et al 1 Barnes 7-5n-11w
S.D. 1,893 ft., Ste. Genevieve 1,550 ft.

Douglas County

Pogue et al 1 Owens.....NW SW NW 26-15n-7e
Drilling 125 ft.

Effingham County

Turner 1 Pruett.....SE SW NW 7-5n-3e
S.D. 1,788 ft.

K. Kilpatrick 1 Mason Comm. .... SE SE NW 2-6n-5e
T.D. 2,502½ ft., D.S. test 2,489-2,502½ ft., open 19 minutes and began to flow, pay 2,489-96 ft., set 5½-in. 2,488 ft., drilling plug.

Fayette County

Luttrell et al 1 Bail.....NE SW SE 16-7n-3e
Drilling 987 ft., 8⅝-in. 22 ft.

John Pummill 1 Isbell.....NW NE SW 33-8n-1w
Drilling 1,262 ft.

Kingwood 1 Aulsamp.....SW SE 30-5n-3e
Rigging up. First report.

Ford County

Nelson et al 1 Erp.....SW NW SE 19-24n-7e
St. Peter 2,112 ft., S.D. 2,373 ft.

Franklin County

G. Verhorsky 1 L. Auten.....W½ SE SW 22-7s-4e
Drilling 2,710 ft.

Helmerich & Payne 1 P. M. Marvel .....
NW NW SW 36-7s-4e
Drilling 2,920 ft., Glen Dean 2,530 ft.

Gallatin County

Egyptian Tie & Timber 2 fee....SE NE SW 16-8s-10e
T.D. 2,094 ft., P.B. to 2,090 ft., waiting on pipe.

Carter 1 B. M. York.....SE SE SW 33-7s-8e
Ste. Genevieve 2,615 ft., St. Louis 2,836 ft., T.D. 2,840 ft., P.B. to 2,050 ft., drilled out pipe in Palestine, H.F.W., squeezed.

Snowden & McSweeney 1 Frey. SE SE NW 19-8s-10e
Glen Dean 2,231 ft., Golconda 2,278 ft., Benoist 2,597 ft., McClosky 2,762-74 ft., test showed trace water S.D.

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Hamilton County

Kingwood 1 Williams ..... S½ SE NE 3-4s-6e
Ste. Genevieve 3,377 ft., St. Louis 3,566 ft., swabbed 150 bbl. oil and 17 bbl. water in 12 hr., later swabbed 30 bbl. oil and 160 bbl. water in 8 hr., P.B. to 3,521 ft.
Exchange-Kingwood 1 Prince ..... NW SW NW 31-5s-7e
Ste. Genevieve 3,090 ft., McClosky 3,126 ft., St. Louis 3,247 ft., D.S. test in McClosky showed oil and water, T.D. 3,257 ft.
Kingwood 1 McGuire ..... W½ SW NW 11-5s-7e
Rigging up. First report.

Hancock County

Sam Tate et al 1 J. Rice ..... SW NE NW 28-4n-5w
Drilling 1,312 ft.

Jasper County

Anderson & Vorhees 1 A. Pippen SE NW SW 16-8n-10e
McClosky 2,551 ft., drilling 2,581 ft., now pumping 2 bbl. oil and 120 bbl. water per day, testing.
Pure 1 Dickerson-Harvey Con. E½ NW NW 17-5n-10e
Drilling 2,515 ft., Glen Dean 2,295 ft., 8⅝-in. 233 ft.
Jasper Oil 1 O. Poehler ..... N½ NE NW 7-5n-10e
Drilling 2,662 ft., Glen Dean 2,338 ft., Cypress 2,610 ft., sand 2,622 ft.

Jersey County

Hughes Pet. 1 Kollall ..... SE SE NE 22-8n-12w
St. Peter 1,148 ft., S.D. 1,160 ft.

Jefferson County

Obering & Phillips 1 A. F. Howe .. NE SW SW 25-2s-1e
Drilling 1,829 ft., Menard 1,366 ft., Waltersburg 1,405 ft., Glen Dean 1,590 ft., Cypress 1,829 ft.

Lawrence County

Robinson 1 Sauers ..... NW SE NW 20-3n-12w
Devonian 3,395 ft., drilling 3,575 ft.
W. Payne 1 H. Payne ..... NW SW NW 20-3n-11w
Drilling 308 ft., 12½-in. 305 ft.
United Drilling 1 Fornhoff ... SW NW SE 27-2n-13w
Putting on pump, T.D. 2,721 ft., 5½-in. 2,675 ft.
Ky. Nat. Gas 4 Bierhaus ..... S½ NW SE 13-4n-11w
12½-in. 52 ft., 10-in. 211 ft., drilling 350 ft.
Hafner et al 3 C. Cronin ..... SE SW NW 24-3n-13w
Pits. First report.

Madison County

G. A. Fisher 1 F. C. Kiskadden SE SW NE 27-5n-8w
S.D. 190 ft.

Marion County

Clevetin Prod. 1 E. Squibb ..... S½ SE SE 29-3n-3e
Drilling 250 ft., 10-in. 70 ft.

Macoupin County

O. L. Smith 1 Klein ..... SE NW NE SE 7-9n-7w
S.D. 1,200 ft.
Bridge & Valbert 1 Feiker ..... NW NE SW 1-9n-7w
S.D. 555 ft.

McLean County

Funks Grove O. & G. 1 Crawford ..... NW NW NW 28-22n-1e
Drilling 350 ft.

Montgomery County

H. C. Detrick 1 W. H. Barnes NW NE SE 20-10n-2w
Fishing 1,010 ft.
W. L. Topf 1 Neiman ..... E½ E½ SE 30-8n-5w
Drilling 800 ft., 7-in. 780 ft.
W. L. Topf 1 Fisher ..... NE NE SW 19-9n-3w
Chester 835 ft., drilling 917 ft.
H. Greene 1 Blackburn ..... SW SE NE 7-7n-2w
Cellar and pits.
Scherrer et al 1 Johnson ..... NW SW SE 24-10n-5w
5½-in. at 560 ft., 8-in. at 345 ft., 10-in. at 90 ft.
L. C. Kessler 1 A. Nowak-A ..... SE NE NW 11-7n-4w
7-in. at 894 ft.

Pope County

Ohio 1 Gen. Amer. Life ..... NE SE SE 10-11s-5c
Palestine 379 ft., Tar Springs 678-729 ft., slight show, Glen Dean 754 ft., Golconda 885 ft., Cypress 1,040 ft., show oil 1,090 ft.

Randolph County

Anderson et al 1 S. Carney ..... SW NW NE 21-7s-7w
St. Louis 446 ft., S.D. 597 ft.
J. R. Rankin 1 B. Bierman ..... SW SW SE 3-7s-5w
Drilling 370 ft.
F. Oswaldt et al 1 J. C. Fullerton NW SW SW 26-5s-6w
Louisiana 1,980 ft., Devonian 1,985 ft., S.D. 2,050 ft.

Saline County

Spiller et al 1 Sisk ..... NE NE NE 15-10s-6e
Drilling 600 ft.

Shelby County

J. Powell et al 1 P. H. Fritz ..... SE SE NW 23-10n-5e
Glen Dean 1,682 ft., Cypress 1,796 ft., sand 1,820 ft., drilling 1,830 ft.
J. Powell 1 Rincker ..... SW SW SE 22-10n-5e
Benoist 1,904-20 ft., pay 1,941-54 ft. and 1,974-77 ft., Ste. Genevieve 1,999 ft., T.D. 2,138 ft., P.B. to 1,972 ft., set 6⅝-in. 1,942 ft., tested mostly water from behind casing shoe, 20 and 10-qt. shots, 400 ft. fluid 50 per cent water, T.D. 2,138 ft., P.B. to 1,970 ft., squeezed and drilled out 1,966½ ft., filled 300 ft. oil and 150 ft. water in 2 hr., bailing.

Perry County

Thompson 1 K. Prusacki ..... SE NW NE 13-4s-2w
Testing Benoist 1,293-1,303 ft.
G. H. Blankenship 1 Bathon est. .. SW SW NE 15-4s-2w
Menard 720 ft., Vienna 860 ft., Glen Dean 932 ft., drilling 1,050 ft.

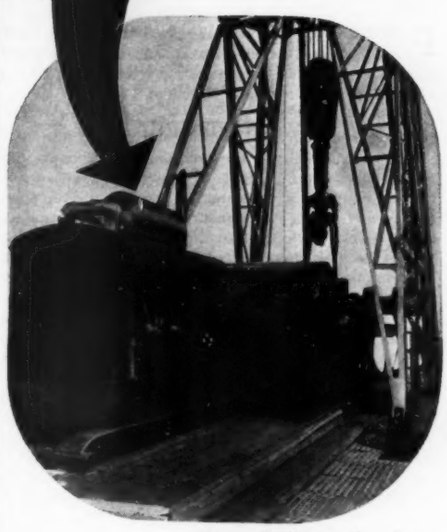
White County

Carl Robinson 1 Taylor ..... S½ NW NE 11-5s-9e
Glen Dean 2,743 ft., Golconda 2,840 ft., Benoist 3,185 ft., Ste. Genevieve 3,308 ft.
O. O. Borden 1 I. McCallister ..... NE SE NE 7-5s-14w
Drilling 2,635 ft., Tar Springs 2,287 ft., Glen Dean 2,393 ft., Golconda 2,473 ft., Cypress 2,602 ft.
Noah & Morrison 1 S. Kershaw .. SW NW NE 22-3s-10e
Drilling 2,703 ft.
J. T. Bradley 1 C. Randolph ..... NE NE SE 32-6s-9e
Menard 2,280 ft., Glen Dean 2,527 ft., Golconda 2,670 ft., Cypress 2,765 ft., Benoist 2,890 ft., Ste. Genevieve 3,005 ft., Rosiclare 3,033 ft., show 3,035-48 ft., testing.
Patton-Cary 1 Reeves heirs ... SW NW SE 28-3s-14w
Drilling 1,600 ft.
Sphenhauser & Brenton 1 C. Shrevers ..... NE SW NE 4-3s-8e
Drilling 130 ft.
W. W. Grev 2 fee ..... SW SW NE 14-4s-14w
Drilling 680 ft.

Woodford County

Morton O. & G. 1 J. E. Roche .... SE SE NE 18-25n-1e
Drilling 1,095 ft.

How to STOP Exhaust Noise on your Diesel Drilling Rig



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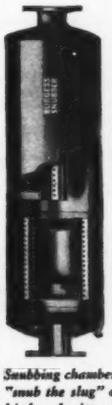

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Five Deep Tests Under Way in West Virginia, Two to Clinton

By STAFF CORRESPONDENT

PITTSBURGH, Pa., Nov. 18.—During the past week in the lower eastern fields, 19 operations were completed of which 2 were dry, 14 gas wells, and 3 oil producers with a daily initial of 14 bbl.

WEST VIRGINIA

In Kanawha County, the Columbian Carbon Co. has started deepening another Oriskany gas well to the Clinton sand and it is located on the Copenhaver heirs tract near Coopers Creek about 3 miles from the mouth of the creek, in Poca district. It is now about 200 ft. below the Oriskany sand. On the John Price farm, this company is drilling at 6,156 ft. and nearing the Clinton sand.

In Harrison County, Hope Natural Gas Co. has reached 8,058 ft. in the deep rotary test on the C. S. Gribble farm in Grant district. It is now reported that it may be carried to the Clinton sand.

In Ravenswood district, Jackson County, Columbian Carbon Co. is drilling three wildcats. The test on the P. F. Riggs farm is down 3,125 ft., on the F. F. Starcher farm 2,060 ft., and on the F. L. Roliff farm 600 ft. In Ripley district the wildcat of the United Carbon Co. on the B. B. Meadows farm is drilling at 1,870 ft.

Boone County

Crook district Pond Fork 17 fee, 1,250,000 cu. ft. gas, Big lime 1,842-2,054 ft., Big Injun 2,054-83 ft., Berea 2,552-67 ft., Brown shale 2,900-3,750 ft., gas from Big lime and Brown shale, T.D. 4,290 ft.
Sherman district: Pure 167 Lafollette, Robson & Prichard, 302.000 cu. ft gas, Salt sand, T.D. 1,730 ft.

Braxton County

Otter district: R. L. McCulty et al 3 Phillip Gerwig, 10 bbl., Maxton sand, T.D. 1,860 ft.

Clay County

Buffalo district: Pittsburgh & W. Va. 7739 P. A. McLaughlin, dry, Injun sand 1,963-2,078 ft., T.D. 2,124 ft.

Lewis County

Freemans Creek district: Hope 8525 A. L. Griggs, 107,000 cu. ft. gas, Injun sand, T.D. 1,924 ft.

Pleasants County

Jefferson district: B. C. Deem, Jr. 3 fee, 2 bbl., Squaw sand, T.D. 1,890 ft.

Ritchie County

Grant district: Richards & Moats 5 Stout & Jackson, 310,000 cu. ft. gas, Keener sand, T.D. 1,710 ft.

Wayne County

Union district: Southern W. Va. 28 R. J. Pritchard et al, 260,000 cu. ft. gas, Big lime 1,362-1,511 ft., Big Injun 1,540-1,620 ft., Berea 2,137-41 ft., Brown shale 2,625-3,129 ft., gas from Big lime, Injun and Brown shale, T.D. 3,141 ft.

ORISKANY GAS FIELDS

Kanawha County

Poca district: Godfrey L. Cabot 4 D. Holmes Morton, 848,000 cu. ft. gas before shot, Corniferous lime 4,862 ft., Oriskany 4,970 ft., T.D. 5,027 ft.
United Carbon 1 William Wines, 946,000 cu. ft. gas after shot, Corniferous lime 4,886 ft., Oriskany 5,000 ft., T.D. 5,080 ft.

DRILLING

Poca district: Godfrey L. Cabot 5 D. Holmes Morton, 4,885 ft.
Godfrey L. Cabot 14 Putnam Co., 1,775 ft.
Godfrey L. Cabot 5 J. L. McLean heirs, 1,605 ft.
Godfrey L. Cabot 7 J. L. McLean heirs, 1,550 ft.
Godfrey L. Cabot 4 Helen M. Hoge, 4,340 ft.
Godfrey L. Cabot 1 Mary A. Mason, 2,930 ft.
United Fuel Gas 4.880 Allie M. Pritt, 1,849 ft. fishing.
United Fuel Gas 4892 J. A. Wines, 2,881 ft.
United Fuel Gas 4895 Lillie Dawson, 881 ft.
United Fuel Gas 4893 K. E. Legg, 880 ft.
United Fuel Gas 4983 M. D. Shafer, building rig.
United Carbon 1 Robert Wines, Corniferous lime 4,858 ft.
United Carbon 1 J. W. Burdette, 4,604 ft.
United Carbon 1 A. S. Peters, 2,880 ft.
United Carbon 1 Lillie Sigman, top Corniferous 4,759 ft.
United Carbon 1 Q. O. Tolley, top Corniferous 4,854 ft.
Columbian Carbon 1 L. D. Reynolds 4,685 ft.
D. H. Stephenson et al 1 R. B. Baldwin, top Corniferous 4,712 ft.
West Virginia Gas Corp. 1 J. C. Legg, 3,242 ft.
T. C. Matthews 1 Emily S. Higginbotham, 2,660 ft.
Poca Fork Oil & Gas Co. 1 Siegle Moore, 1,925 ft.
Joe Rubin 1 E. M. Derrick, 545 ft.
Hays Oil & Gas Co. 1 J. H. Young, rigging up.

Jackson County Drilling

Ripley district: Rubin & Rafferty 1 Marco & Mary Garnes, 3,260 ft.
Columbian Carbon 1 D. E. Anderson, 5,093 ft.
McIntosh & Grimm, 1 D. E. Anderson 1,605 ft.
United Fuel Gas 4890 J. F. Miller, 4,345 ft.
United Fuel Gas 4896 Ethel Duff Monday, rigging up.
Godfrey L. Cabot 6 Putnam Co. 1,225 ft.
Godfrey L. Cabot 11 Putnam Co., 3,640 ft.
West Virginia Gas 1 F. T. Huffman, 4,990 ft.
West Virginia Gas 1 L. T. Huffman, 2,440 ft.
Washington district: R. E. McCabe 2 F. M. Ray, 2,950 ft.
United Fuel Gas 4886 W. B. Good, 4,944 ft.
Godfrey L. Cabot 1 Charles L. Mangus, 5,128 ft.

NEW WORK

Boone County

Crook district: Westmoreland, Inc. 2 fee, elev. 984.3 ft.

Braxton County

Otter district: Pittsburgh & W. Va. 7769 O. J. Bowin, elev. 1,284 ft.

Gilmer County

Glenville district: McCall Drlg. Co. 1 Margaret E. Arbuckle, elev. 805 ft.

Kanawha County

Poca district: West Virginia Gas 1 L. O. Fisher.
Godfrey L. Cabot 6 J. L. McLean heirs.
Godfrey L. Cabot 16 Putnam Co.

Pleasants County

Lafayette district: Maxton Oil & Gas Co. 2 First National Bank, St. Mary's, elev. 1,000.5 ft.

Wetzel County

Grant district: Hope 8530 John W. Lowe, elev. 1,117 ft.

SOUTHWEST PENNSYLVANIA

On Chestnut Ridge in South Union Township, Fayette County, Peoples Natural Gas Co. has reached 6,574 ft. in 2 Piedmont Coal Co. or 153 ft. below the top of the Onondaga chert. Another 25 ft. should reach the Oriskany sand. No appreciable gas increase has been noted below 6,464 ft. This company's No. 3 is drilling at 4,418 ft.

South along the ridge, the New Penn Development Co., William E. Snee, et al are drilling 3 Summit Hotel (Heyn) at 615 ft. In North Union Township, Wasson et al have reached 6,489 ft. in 2 J. H. Sorg or about 139 ft. below the top of the Tully lime.

In Maryland, New Penn Development Co., William E. Snee, et al recovered bottom in the new hole in the test on the Humberson farm on the Accident dome in Garrett County and are shut down running a survey of the hole. The new hole is 6,366 ft. deep.

Fayette County

South Union Township: Eberly et al 1 Mrs. Mary Huhn, 452.000 cu. ft. gas, Fifth sand, T.D. 2,239 ft.

Greene County

Jackson Township: Brummage et al 1 Frank Gilbert, 60,000 cu. ft. gas, Byard sand, T.D. 3,454 ft.
Richhill Township: Peoples 1 S. N. Rinehart, 300,000 cu. ft. gas, Gordon strav sand, T.D. 3,487 ft.
Whiteley Township: Waynesburg Home Gas Co. 2 A. J. Morris, 119,000 cu. ft. gas, Bayard and Bayard stray sands, T.D. 3,085 ft.
Greene County Gas Co. 1 James Orndoff, 189,000 cu. ft. gas, Bayard sand, T.D. 3,080 ft.

Washington County

Amwell Township: H. V. Sprowls et al 2 Clarence Vankirk, 100,000 cu. ft. gas, Little Dunkard and gas sand, T.D. 1,392 ft.
North Franklin Township: E. H. Tague 17 A. D. McKennan estate, 2 bbl., Little Dunkard sand, T.D. 892 ft.
South Strabane Township: Victor Behm et al 1 J. S. Smith, drilled deeper, dry, Fifth sand.

Westmoreland County

Allegheny Township: Hyde Park Foundry 2 Andrew Grinder, 70,000 cu. ft. gas, Murraysville sand, T.D. 3,100 ft.

DRILLING

Armstrong County

Bethel Township: T. W. Phillips 1 Mrs. H. E. Gilchrist, 1,540 ft.
Boggs Township: J. K. Sharp et al 1 Joseph Sefton, 200 ft.
Burrell Township: Equitable 1 Mrs. George Ctavener, 1,860 ft.
Cowanshannock Township: Peoples 1 James McKinney, 2,980 ft.
Peoples 1 William Boyer, rigging up to deepen.
T. W. Phillips 3 Harry Boyer, 460 ft.
Shelocta 1 Park Rearick, location.
William McCollins 1 A. L. McCullough, building rig.
East Franklin Township: Leithold Gas Co. 1 John Roofner, 1,075 ft.
Kiskiminitas Township: Shaw & Townsend 1 Michael Zitterberg, 2,600 ft.
Appollo Gas Co. 2 J. P. Wilson heirs, 517 ft.
Kittanning Township: Local Company 1 B. H. Shreckengast, 1,535 ft.
Equitable 1 David Shoemaker, 3,600 ft.
Plum Creek Township: Shelocta 2 Harry Kough, building rig.
Wayne Township: Penn Wayne 2 Ed Clever, 2,950 ft.
Daniel Sowers et al 2 William Rupp, 2,515 ft.
Lowden Drilling Co. 1 Armstrong Trust Co., 690 ft.

Clarion County

Monroe Township: Owens-Illinois Glass 1 J. C. Henirick, fishing.
Piney Township: Frank Shreffler 8 Clarion County Home, 625 ft.
Porter Township: Squirrel Hill Gas Co. 2 Charles Fagler, spudding.
Gourley Gas Co. 3 Andrew Gourley, 30 ft.
Red Bank Township: T. W. Phillips 1 E. C. Buffington, 1,750 ft.
T. W. Phillips 1 D. D. Miller, 1,630 ft.
Mayport Clay Co. 1 Samuel Wyncoop, 900 ft.

Fayette County

German Township: J. H. Carnell 1 Albert Lily, 1,060 ft.
Menallen Township: Eberly, Snee et al 1 Bachman, rigged up.
Nicholson Township: Greensboro Gas Co. 1 George Lecrone, 220 ft.
Greensboro Gas Co. 1 Frank Mozo, 1,585 ft.
Duquesne 1 Hattie Talbert, 300 ft.
Noolen Oil & Gas Co. 1 J. D. McCann, location.
Wahler-Powers 1 McKeefry Coal Co., 1,316 ft.

Greene County

Center Township: Devine et al 1 Hugh Smith, 1,675 ft.
Jackson Township: Equitable 1 Ocie M. Kerr, 3,030 ft.
Monongahela Township: Mayne et al 1 Stephenson, 1,300 ft.
Harry Scott et al 1 Silas Provins, 500 ft.
Greensboro Gas Co. 1 Charles Hopton, rigged up.
Morris Township: Romney Rutan et al 1 I. J. Clutter, building rig.
Richhill Township: Carnegie 2 Ella Sowers, rigging up to deepen.
Wasmuth & Callahan 1 Goodwin heirs, will deepen from 1,413 ft.
Whiteley Township: Lewis Petit et al 1 Shields, 1,773 ft.
Wayne Township: Freeland et al 1 J. H. Simpson, 2,005 ft.

Indiana County

Armstrong Township: T. W. Phillips 1 W. S. Sell, 400 ft.

(Continued on Page 76)

California Fields

(Continued from Page 65)

his second well on the Lincoln property and normal progress is being made. It will probably be another 60 days before this well reaches the pay as formations in this region are tough and slow up the bit. No. 2 Lincoln is lower structurally than 1 Lincoln, the discovery well, as the operator is attempting to get outside the gas-cap area so as to be able to produce with a lower gas-oil ratio. This will not only result in a higher ultimate production but will also remove the well from operation of the California gas law with respect to the blowing of gas. A number of tentative locations have been made in the Newhall-Castaic region during the past few weeks and additional drilling is expected to get under way shortly. Western Gulf Oil Co. has a tentative location on the Lechler property in 31-5n-17w, but has not yet indicated when actual work will start. This well, contrary to prevalent reports, will not be a joint test with other operators participating but will be drilled by Western Gulf for its own account. Western Gulf Oil Co. acquired this property some time ago from Burnoel Oil Co., which retained an overriding royalty.

COASTAL DISTRICT COMPLETIONS

Santa Maria Valley Field

Union 2-1 Bradley 36-10n-34w
Pumped 121 bbl., 12.3-gravity, 5 per cent cut, elev. 358 ft., T.D. 5,070 ft. in Santa Margarita, 7-in. oil string landed 5,067 ft. and cemented through perf. at 4,665 ft., perf. open to production 4,674-5,067 ft., 4,903 ft. 3-in. tubing, top Foxen 1,709 ft., top Santa Margarita 4,699 ft.; 37 days total elapsed drilling time. Santa Barbara County.

Ventura Avenue Field

Shell 125 Taylor 29-3n-23w
Flowed 1,328 bbl., 30.9-gravity, 2.3 per cent cut, 3,200,000 cu. ft. gas, 128/64-in. bean, pressures 200/900 lb., elev. 361 ft., T.D. 7,190 ft. in pay, 7⅝-in. water string cemented 6,070 ft., 1,156 ft. 5½-in. liner landed 7,185 ft., perf. open to production 6,075-6,162 ft., 6,702-25 ft., 6,785-6,887 ft., 6,945-7,185 ft.; 7,049 ft. 2½-in. tubing; 29 days total elapsed drilling time. Ventura County.

COASTAL DISTRICT WILDCATS

Capitan District

Milburn & Hamilton 1 Rutherford 36-5n-31w
Drilling 433 ft. in sand and shale.

Cat Canyon District

Union 11 Bell 27-9n-33w
Drilling 5,250 ft. in sandy shale. Santa Barbara County.

Huasna District

Harvey Oil Corp. 1 Huasna 11-32s-14e
Drilling T.D. 3,577 ft. in sand and shale. Formation test 3,360-3,420 ft., recovered 1 bbl. mud, no oil. Resumed drilling. San Luis Obispo County.

Tar Springs District

Superior 1 Tar Springs 24-32s-14e
Drilling 6,512 ft. in hard shale. San Luis Obispo County.

Wildcat Locations Increase in Fort Worth Basin Play

By
R. MARNE SANFORD

WICHITA FALLS, Tex., Nov. 18.—The Ross field and the Hapgood field in Clay County were both given extension producers during the week. Wildcat tests in Jack County and Archer County reported shows of oil in the deep zones and were preparing to test at the close of the week. The Fort Worth basin play was further advanced as three new wildcat locations were made, two in Montague and one in Jack County. Wilbarger County was given a new wildcat location and the recently opened Benton field in Montague County received two new locations.

About a mile north of the Ross field in northwestern Clay County, opened by Continental Oil Co., last year, an outpost had cemented casing and was preparing to test at the close of the week. It is R. H. Dearing & Sons, Dallas, 1 J. M. Hatfield, 467 ft. from the south and west lines of the W. G. Glass Survey. This is the most important extension yet given the field, all of the producers having been drilled by Continental as one-location outposts. The new prospective well topped the Caddo lime at 5,449 ft. and recovered saturated streaks of lime from 5,442 to 5,505 ft., total depth. The nearest well in the field is Continental and Petroleum Producers 1 Ross, Section 8, Wyont Survey, west of the discovery. This well is preparing to complete from saturation from 5,516 to 5,559 ft. Top of the Caddo lime was 5,516 ft., several feet lower than the top called in the north outpost.

About a third of a mile southeast extension for the Hapgood field in eastern Clay County is indicated at the Lipscomb & Grimes 1 Hapgood, Block 68, Marion County School Lands Survey, southeast of the discovery well. A 3-minute drill-stem test from 6,072 to 6,096 ft. showed a blow of gas and a recovery of 35 ft. of oil in the tester. Casing is being cemented for completion attempts.

Wildcats Get Oil Shows

A show of oil in the conglomerate section found in North Texas proper was reported for a wildcat in the extreme southeast corner of Jack County. It is Rathke Oil 1 H. L. Moseley, John Harrison Survey, 12 miles southeast of Jacksboro. With the top of the Caddo reported at about 4,470 ft., shows of oil and gas were found in a conglomerate from 4,500 to 4,510 ft. These shows were found about 2 weeks ago, at which time the test was shut down due to title trouble. During the past week the gas began to blow and developped into a spray of light green crude. Originally contracted to 3,650 ft., the wildcat had been deepened toward an undetermined contract depth. As the week closed operators were preparing to attempt commercial completion.

In southern Archer County oil was recovered at a deep test about 4 miles northwest of the town of Anarene. It is W. B. Hamilton 22 Cartwright, James Webb Survey, a deep exploratory hole in an old shallow area. Hard sand was cored from 5,149 to 5,160 ft., with lime from 5,160 to 5,164 ft. A drill-stem test of the section recovered 90 ft. of oil in 40 minutes. After drilling ahead in dry lime and shale to 5,211 ft., operations were halted to set 7-in. casing at 5,145 ft.

New Wildcat Tests

Two new wildcat tests were staked in Montague County during the week. Just 2 miles northeast of the town of Ringgold, W. B. Omohundro, Wichita Falls, who opened the Ringgold field just south of the town, has staked location for 1 I. V. Parr, south part of the T. G. Simmons Survey, Abstract 727. It is on a 2,000-acre block assembled by M. T. McLaughlin. Contract depth is 6,000 ft.

The second Montague location was by Phillips Petroleum Co. as 1 H. D. Fields, southwest corner of the J. L. Graham Survey, seeking a northeast extension to the Benton & Holmes field of the eastern part of the county.

In Jack County, O. J. Perren has made location for a 3,200-ft. test as 1 W. L. Brumbelow, northeast corner of the 280-acre farm in the southeast part of the H. C. Ayers Survey, Abstract 4, about 7 miles northeast of the Bryson field.

Wilbarger County gained a new wildcat when Consolidated Oil Co. staked 1 C. Pollan, a 4,500-ft. operation located on a 153-acre tract in Section 9, Block 16, H.&T.C. Survey, 4 miles north of the town of Tolbert. It is on a 1,400-acre block surveyed by seismograph.

Also in Wilbarger County and west of the town of Harrold, Big Six Oil Co. of Wichita Falls has staked 1 A. P. Morris, a 5,000-ft. test in the SE cor. of Section 3, Block 14, H.&T.C. Survey.

Benton Field

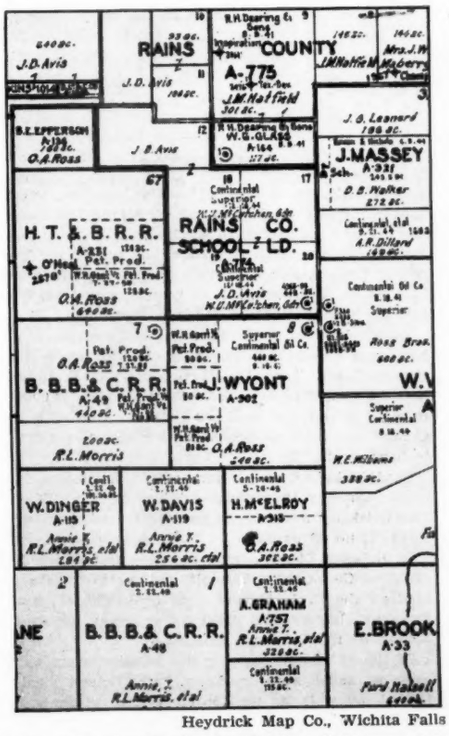
As the third and fourth operations, respectively, for the recently opened Benton field in Montague County, just east of the town of Nocona, Stanolind and Chapman & McFarlin have each staked a test. Stanolind's operation is 1-B Dodson, a north offset to the company's recent completion for the second well in the field. The Chapman & McFarlin operation is 1 C. P. Dodson, a north offset to the new location by Stanolind.

In Archer County, Fain-McGaha Oil Corp., Wichita Falls, has staked location for a new outpost to the Hull-Silk field. It will seek production from the deep 4,700-ft. Strawn in an area where the firm has had a lone producer from a new pay level for about a year. The new test is 1-A Nichols, ½ mile east of the discovery producer and located in the SW SW Section 46, A.T.N.C.L. Survey. Contract depth is 4,800 ft.

NORTH TEXAS COMPLETIONS

Archer County

Holliday field: Alexander 1 White, 6 bbl., 445-56 ft.
Shappell Oil 1 Gulf fee, 26 bbl., 1,782-89 ft.
Hull-Silk field: Cochran & Cain 1 Wilson, dry at 4,800 ft.
Cox & Hamon 8, 9 and 10 Little, abandoned locations.
Cox & Hamon 3 Nichols, abandoned location.
Ligon 9 White "D," dry at 1,650 ft.



Heydrick Map Co., Wichita Falls

First major development for the Ross field opened in Clay County last year by Continental Oil Co. was pending this week as both a mile north outpost and a mile west outpost were preparing to complete

Texas 33 Wilson "A," 348 bbl., 4,363-99 ft.

Baylor County

Seymour field: Hall-Jordan Oil 1 Fayette Co. Sch. Lds., abandoned location.

Clay County

Halsell field: Bridwell Oil 6 Halsell, 362 bbl., 4,730-69 ft.
Wildcat: G. C. Fox 1 J. B. Dunn, dry at 1,900 ft.
Thornberry field: Johnson & Kourl 2 Taylor, dry at 1,350 ft.
Norwood & Wood 1 Texas Land Bank, dry at 366 ft.

Cooke County

Walnut Bend field: Magnolia 11 Ramsey, 907 bbl., 4,761-83 ft.

Jack County

Bryson field: Panhandle Ref. 3 Leffel, 10 bbl., 3,002-15 ft.

Montague County

Nocona field: Claymount Oil 4 Bouldin, 10 bbl., 813-24 ft.
Claymount Oil 5 Bouldin, 30 bbl., 802-19 ft.
Wildcat: Owens & Hults 1 Tucker, 1,085 bbl. in 12 hr., 6,016-50 ft.
Seitz, Comegys & Seitz 1 Harris, dry at 6,939 ft.
Bonita field: Sinclair Prairie 1 Bonita Unit North, 1,501 bbl., 5,433-77 ft.
Rogers & Rogers field: Stanolind 1 Dodson, 885 bbl., 5,094-5,176 ft.

Wichita County

K.M.A. field: Dalport Oil 2 Munger, 487 bbl., 3,800-93 ft.
W. H. Hammon 1 Womack, 107 bbl., 3,703-38 ft.
King Oil 10 Stone, 248 bbl., 3,635-67 ft.
Melat & Graham 7 Munger, 550 bbl., 3,715-3,883 ft.
Sunray 3 Denny "A," 475 bbl., 3,923-91 ft.
Tide Water 13 Mangold, 550 bbl., 3,704-3,800 ft.
Tide Water 26 Pettit, 650 bbl., 3,677-3,790 ft.
Electra field: Farrell 50 Waggoner, 10 bbl., 795-800 ft.
Hanlon-Buchanan 1 Burnett "B," dry at 1,329 ft.
George Proctor 2 Foster, dry at 1,050 ft.
Texas 77 Honaker, 1 bbl., 1,058-61 ft.
Burkburnett field: Ruyle Farm Oil 21 Ruyle, 10 bbl., 1,138-51 ft.
Staley Oil 2 Glass, 24 bbl., 1,320-27 ft.
Iowa Park field: Winfrey 7 Birk & George, dry at 875 ft.
Winfrey 1 Lowrance, dry at 672 ft.

Wilbarger County

Fargo field: Amerada 1 Dodson, 385 bbl. in 9 hr., 3,246-79 ft.
Vernon field: Davis Oil 10-A Waggoner, 920 bbl., 3,568-79 ft.
Stilley 1 Wheeler, 8 bbl., 1,306-17 ft.

Young County

Olney field: Bohner 14 Prideaux, 10 bbl., 554-68 ft.
Brashear 2 Jeffery, abandoned location.
Burns 1 Bloodworth, dry at 883 ft.
Burns 1 Larimore, 50 bbl., 866-76 ft.
Craig 1 Coleman, dry at 1,016 ft.
Glover 1 Gregg, dry at 802 ft.
Glover 28 Johnson, 4 bbl., 572-87 ft.
Glover 29 Johnson, dry at 603 ft.
Harrell 2 Rogers, 70 bbl., 896-902 ft.
Harrell 3 Rogers, 166 bbl., 879-94 ft.
Hunt 9 Gass, 10 bbl., 1,212-25 ft.
Hunt 10 Gass, 11 bbl., 1,201-28 ft.
Sams 4 Prideaux, 10 bbl., 641-50 ft.
Graham field: Strong 1 Allen, 600 bbl., 4,100-4,303 ft.
Strong 1 Eddleman, 510 bbl., 4,101-4,303 ft.

NORTH TEXAS DRILLING REPORT

Archer County

Adams Oil & Gas 1 Turbeville, Lot 39, J.C.S.L. Sur., 5,000-ft. test, drilling 3,195 ft.
Walter Gant 1 Hunter, SE NW Sec. 7, Blk. 1, H.&T.C. Sur., 5,300-ft. Caddo lime test, location.
Jack Kadane 1 Griffin, SW SE Blk. 13, P.P.C.S.L. Sur., 4,500-ft. test, 1½ mi. E Griffin field, S.D. 4,522 ft.

Baylor County

Rogers & Lanfair 1 Howe, J. Howe Sur., Abst. 572, S.D. 2,215 ft.

Clay County

E. C. Norwood 1 Shipley, Blk. 29, Madison C.S.L. Sur., deepening below 5,066 ft., S.D. 6,002 ft.

Cooke County

Dick Eubank 1 Sam Seagraves, SE cor. O. M. Gray Sur., Abst. 415, near Hood, 2,200-ft. test, Ordovician, rigging up.

Denton County

Amon G. Carter 1 W. P. and A. P. Allen, S. Westbrook Sur., drilling 5,283 ft.
Harvey Bros. 1 Knox, R. Howard Sur., Abst. 542, old T.D. 1,357 ft., show oil 1,467-93 ft., set 6⅝-in. at 1,465 ft., drilled plug, show oil and gas, S.D.

Grayson County

Texas Co. 1 Hutchinson, Samuel Stewart Sur., northeast corner of county, 7,500-ft. test, drilling 4,525 ft.

Hood County

W. G. Martin 1 W. F. Thormann, E cor. of 2,956-acre ranch, F. F. Anderson Sur., 5,000-ft. test, location.
Aztec Oil 1 Gallagher, SW SE Robert Alway Sur., 3,000-ft. test, T.D. 1,180 ft.

Jack County

Continental 1 Robertson, M. J. Swan Sur., Abst. 1650, Drilling 4,959 ft.

(Continued on Page 78)

Activity Increasing in Newly Discovered Vincennes Field

By STAFF CORRESPONDENT

EVANSVILLE, Ind., Nov. 18.—Activity in Indiana increased slightly during the past week with the completion of 19 wells. Of these, six were dry and there were 13 producers with an initial production of 1,755 bbl. The majority of the producers were in Gibson County, while the remaining completions were in several scattered counties.

Activity in the new Vincennes pool in Knox County consisted of one location, two drilling wells, and three wells near completion. In addition, one large producer, one small producer, and one dry hole were completed.

Of the 95 wells carried in current drilling reports, 12 are locations, 11 are rigs, 1 has spudded in, 29 are shut down, 24 are drilling, and 8 are being completed.

INDIANA COMPLETIONS

Daviess County

Midwest et al 1-A Dille ..... NW NE NE 2-2n-5w
Dry, Devonian 1,770 ft., T.D. 2,075 ft.

Gibson County

R. L. Bauman et al 1 Kleiderer ... SE SE SE 28-3s-14w
Pumped 85 bbl., 3,000 gal. acid, pay 2,860-79 ft., T.D. 2,880 ft.
Continental 2 Mumford-A ..... NE NW NE 25-3s-14w
Pumped 102 bbl., 2,095-2,133 ft., T.D. 2,133 ft.
Continental 15 Bozeman ..... NW NE NE 23-3s-14w
Pumped 210 bbl., pay 2,465-72 ft., 2,489-2,525 ft., T.D. 2,525 ft.
Hall Edwards 12-A Maier ..... NW NE SE 14-3s-14w
Flowed 300 bbl., 2,500-23 ft., T.D. 2,523 ft.
Hall Edwards 11-A Maier ..... SW NE SE 14-3s-14w
Flowed 300 bbl., 2,491-2,520 ft., T.D. 2,520 ft.
Papoose 14 Cooper-A ..... NW NE SW 13-3s-14w
Pumped 175 bbl., 3,000 gal. acid, 2,849-59 ft., T.D. 2,859 ft.
Joe Bander et al 39 Cooper ..... NW NW NW 19-3s-13w
Pumped 105 bbl., 80-qt. shot, 2,089-97 ft., T.D. 2,097 ft.

Knox County

Loma Drlg. 1 Schaller ..... SE NW SW 24-2n-11w
Dry, T.D. 1,922 ft.
Loma Drlg. 1 Winckler ..... NW NW NW 25-2n-11w
Pumped 30 bbl., 2,000 gal. acid, 1,870-75 ft., T.D. 1,880 ft.
Dee Miller 1 Sanneman ..... NE NE SW 24-2n-11w
Pumped 11 bbl. per hr., 2,000 gal. acid, 1,890-95 ft., perf. 1,823-29 ft., pay 1,890-95 ft. and 1,823-29 ft., T.D. 1,895 ft.

Posey County

Harry Sandler et al 6 Keck ..... NW SW NW 34-3s-14w
Location abandoned.
W. C. McBride 6 Swanders ..... NW NE NE 4-4s-14w
Pumped 286 bbl., 20-qt. shot 2,804-16 ft., T.D. 2,818 ft.
Paul Rossi 1 Egli ..... NE SE NW 19-6s-12w
Dry, Glen Dean 2,099 ft., Cypress shaled out, T.D. 2,400 ft.
Hagan & Thomas 5 Seifert ..... SW NW SE 19-6s-12w
Pumped 10 bbl., 5-qt. shot, 355-404 ft., T.D. 404 ft.

Randolph County

Unionport O. & G. 1 Haynes ..... SE NW 20-19n-13e
Dry, Trenton 1,054 ft., T.D. 1,114 ft.
Unionport O. & G. 1 Johnson ..... SW NE 9-19n-13e
80-qt. shot 1,024-37 ft., Trenton 997 ft., T.D. 1,043 ft.
Mrs. John Selp 1 Clevenger ..... NE NE NE 8-19n-13e
Dry, T.D. 1,076 ft.

Vanderburg County

R. R. Bixby 1 Ziss ..... S½ SE SW 30-5s-11w
Pumped 20 bbl., 140-qt. shot, 1,200-54 ft., T.D. 1,254 ft.
Weir & Sparrow 1 J. B. Nurrenburg et al ..... NW NE SW 5-7s-11w
Dry, water 1,115 ft., T.D. 1,170 ft.

INDIANA DRILLING REPORT

Daviess County

Newton P. L. 1 Brittain ..... NE NE SW 15-1n-5w
H.F.W. 2,410-15 ft., drilling 2,495 ft.

Decatur County

Hoosier Pub. Util. 217 Schoettmer ..... SE NE 14-9n-9e
Location.

Elkhart County

A. W. Downs 1 Harman ..... NE NE SE 11-38n-4e
Location.

Gibson County

Newton P. L. 1 Prud. Life Ins. ..... NE NE NE 35-1s-10w
Rig.
Cherry & Kidd et al 1 Hall ..... SW NW SW 31-2s-12w
Sand 1,092 ft., 6 ft. saturated sand between 1,095-1,105 ft., drilling 1,559 ft.
Loma Drlg. 1 Brady ..... NE NE SW 14-2s-12w
Spud.
P. W. Harr et al 1 Weber ..... NE NE SW 32-2s-9w
Set 8-in. 1,330 ft., H.F.W. 1,345-48 ft., drilling 1,419 ft., elev. 489 ft.
Mohawk Drlg. et al 1 Harman ..... NE SE SW 17-3s-11w
Set 5½-in. 2,573 ft., Ste. Genevieve 2,427 ft., pay 2,529-34 ft., St. Louis 2,630 ft., water 2,644-61 ft., waiting on cement.
Continental 1 Green ..... SW SW SE 26-3s-14w
Set 8⅝-in. 234 ft., drilling 2,189 ft.
Papoose 1 Cooper-D ..... SE NE SE 24-3s-14w
Set 10-in. 147 ft., drilling 175 ft.

Greene County

L. B. Jackson et al 1 Holmes ... NW NW NW 22-7n-6w
Set 10-in. 685 ft., drilling 685 ft.

Harrison County

Ind. Util. Corp. 1 Conrad 32-3s-4e
Location.
Ind. Util. Corp. 1 Wheat ..... NW NE SE 32-3s-4e
Location.
Halbert & Schacklette 1 Wiseman ... SW SW NE 25-5s-3e
Location.

Jackson County

J. W. Pearson et al 1 Turnhorn .... SW NE SW 6-4n-5e
S.D. 40 ft.

Knox County

W. C. McBride 2 Met. Life Ins. ... SW SW NE 24-2n-11w
Set 10-in. 147 ft., drilling 680 ft.
W. C. McBride 1 Brevoort ..... SW NE NW 1-2n-11w
Set 10-in. 138 ft., drilling 1,365 ft.

Martin County

Collier & Burton 1 Swayze ..... NW NE NE 10-3n-4w
Glen Dean 213 ft., Cypress 319 ft., set 6-in. 408 ft., drilling 410 ft.

Monroe County

Terry Deskins 1 Carey ..... NW NW SE 5-9n-1e
Location, first report.
Terry Deskins 1 Thompson ..... NE NW SE 18-9n-1e
Location, first report.

Orange County

United States Oil 1 G. E. Willyard ... NW NE SW 33-1n-1w
Location.

Pike County

P. W. Harr et al 1 Burnett .... SW NW NE 26-2s-8w
Set 10-in. 1,090 ft., drilling 1,150 ft.

Posey County

Ed Holeman et al 1 Oeth ..... NE SE NE 6-4s-13w
Glen Dean 2,255 ft., drilling 2,565 ft.
H. G. Lewis et al 1 Wolfe ..... SW NE SE 25-7s-15w
Set 5-in. 1,996 ft., drilling removable pipe 1,896-1,910 ft., T.D. 2,744 ft., P.B. to 2,015 ft.
R. B. Creager et al 1 Reis ..... SE SW NE 1-7s-12w
Set 7-in. 1,763 ft., oil 1,766-80 ft., T.D. 1,780 ft., drilling plug.

Spencer County

Doris McPherson 1 Nichols ..... SW NW NW 10-8s-6w
Drilling 850 ft.
J. E. Ellis et al 1 Spence ..... NW SE 29-7s-6w
Location.
Jim Ellis et al 1 Fisher ..... E½ SW NE 29-7s-6w
Elev. 425 ft., Glen Dean 1,109 ft., Benoist 1,384 ft., drilling 1,500 ft.

Sullivan County

O. A. Thayer 1 Wilson ..... NE NE SE 23-8n-10w
Set 8-in. 40 ft., drilling 150 ft.
S. E. Bailey 1 Wible ..... NE NE NW 36-8n-11w
H.F.W. 877 ft., T.D. 877 ft., P.B. to 588 ft., will test gas 312-29 ft. and 576-86 ft.

OHIO FIELDS

NEWARK, Ohio, Nov. 18.—The test in western Licking County in the Central Ohio area has reached the Trenton horizon. S. D. McCloy, Inc., 1 N. A. Rowe, SW NE Section 21, Jersey Township, topped the Trenton at 3,396 ft. and is drilling in very hard formation at 3,397 ft. No showings have been encountered. Plans call for a testing of the St. Peter horizon.

In southeastern Ohio Barnesville Development Co. has found a small gas showing in the Clinton. In Noble County, Center Township, Section 21, 1 O. E. Heiszler had the first Clinton at 5,598-5,604 ft. with 44,000 cu. ft. of gas showing at 5,599-5,601 ft., top of second Clinton was 5,621 ft. and is drilling ahead at 5,664 ft. in hard sand.

In Ashtabula County, Harpersfield Township, Magnolia 1 Breyley Brothers is drilling ahead at 2,450 ft. The Oriskany was had at 1,905-27 ft., with water at 1,910 ft., no oil or gas.

In Belmont County, Ohio, the deep test of the Natural Gas Co. of West Virginia, drilling to the Clinton sand on the E. A. Mobley farm in Section 19, Smith Township, has reached 5,900 ft., or 200 ft. below the bottom of the Oriskany sand.

Of the 31 completions for the week 18 were gas, 5 were oil, and 8 were dry holes. Perry County yields a 150-bbl. oil well for the top completion of the week.

Ashland County

Mohican Twp.: Obrecht 1 W. O. Obrecht, Sec. 32, 1 bbl., shot, Berea, T.D. 725 ft.

Athens County

Rome Twp.: Gifford et al 4 J. E. Parmiter, Sec. 30, 2 bbl., first Cow Run, shot, T.D. 425 ft.

Cuyahoga County

Independence Twp.: R. G. Hascall 1 fee, Lot 35, Tract 3, 100,000 cu. ft. gas, Clinton, T.D. 3,200 ft.

Fairfield County

Berne Twp.: City Natural 1 F. W. Sharp, Sec. 10, 60,000 cu. ft. gas, Clinton, T.D. 2,135 ft.

Gallia County

Addison Twp.: Cody 1 Ella Rothgeb, Sec. 17, 100,000 cu. ft. gas, shot, second Berea, T.D. 1,797 ft.

Guernsey County

Millwood Twp.: Osborne et al 1 C. Eschbaugh, Sec. 11, dry, Berea, T.D. 1,410 ft.

Hocking County

Ward Twp.: Preston Oil 189 Sunday Creek Coal, Sec. 11, 15 bbl., shot, Clinton, T.D. 3,553 ft.

Holmes County

Monroe Twp.: Ohio Fuel 2 J. B. Finney, Lot 5, second quarter, 280,000 cu. ft. gas, shot, Clinton, T.D 3,398 ft.
Richland Twp.: Ohio Fuel 1 A. A. Starner, Sec. 1, 90,000 cu. ft. gas, shot, Clinton, T.D. 3,332 ft.

Knox County

Howard Twp.: Perkins 1 J. Woolridge, Lot 2, third quarter, show of gas, Clinton, plugged, T.D. 2,585 ft.
Pike Twp.: Upham 1 E. G. Belt, Sec. 23, dry, Clinton, T.D. 2,678 ft.

Lawrence County

Union Twp.: E. F. Franklin 1 Alfred Ward, Sec. 7, 60,000 cu. ft. gas, shot, brown shale, T.D. 2,914 ft.

Newark Field—Licking County

City of Newark: W. R. Mueller 1 Florence Mueller, west part, 710,000 cu. ft. of gas, shot, Clinton, T.D. 2,339 ft.
Davidson 1 D. Day, 660,000 cu. ft. gas, Clinton, T.D. 2,325 ft.
James McCoy 1 William Sex, 200,000 cu. ft. gas, shot, Clinton, T.D. 2,355 ft.
Lacknett et al 1 William Wenzel, north side, 200,000 cu. ft. gas, shot, Clinton, T.D. 2,528 ft.
Everett Co. 1 Mound Mortgage & Loan Co., 400,000 cu. ft. gas, shot, Clinton, T.D. 2,300 ft.
Ohio Fuel 1 George Hell, Lot 5, dry, Clinton, T.D. 2,391 ft.
Washington Twp.: Davidson et al 1 Eli Mills, Lot 1, fourth quarter, 200,000 cu. ft. gas, lime pay 1,827-32 ft.

Lorain County

Eaton Twp.: Ohio Fuel 1 Adelaid Shuster, Lot 47, dry, Clinton, T.D. 2,632 ft.
Grafton Twp.: Forest 1 C. W. Wise, Lot 52, dry, Berea, T.D. 250 ft.

Medina County

Chatham Twp.: R. C. Holmes et al 1 W. C. Carleton, Tract 15, Lot 19, 50 bbl., Berea grit, T.D. 662 ft.

Meigs County

Rutland Twp.: Bengel 1 Marion Phelps, Sec. 26, 200,000 cu. ft. gas, Macksburg 800-ft. sand, T.D. 738 ft.

Morgan County

Marion Twp.: W. S. Harris 5 E. Worthington, Lot 13, dry, Brill, T.D. 1,070 ft.

Monroe County

Adams Twp.: H. B. Walker Co. 1 Oakley Miller, Sec. 32, 870,000 cu. ft. gas, Berea, T.D. 2,161 ft.

Muskingum County

Harrison Twp.: Sutton Brothers 2 John M. Bussemer, NW Sec. 8, 2,000,000 cu. ft. gas, Clinton sand, T.D. 4,159 ft.

Noble County

Enock Twp.: King 1 B. K. Shockling, Sec. 5, dry, Buell Run sand, T.D. 405 ft.
Seneca Twp.: J. T. Watson 1 R. C. Archer, Sec. 26, 50,000 cu. ft. gas, Berea, T.D. 1,588 ft.

Perry County

Clayton Twp.: Palm Oil 2 Z. T. Lyons, Sec. 16, 150 bbl., shot, Clinton 3,282-3,312 ft., T.D. 3,319 ft.
Reading Twp.: Ohio Fuel 1 Effie Love, Sec. 2, 250,000 cu. ft. gas, Clinton, T.D. 2,805 ft.

Stark County

Plain Twp.: East Ohio Gas 3 A. Becher, Sec. 23, 2,800,000 cu. ft. gas, shot, Clinton 4,602-27 ft., T.D. 4,637 ft.

WESTERN KENTUCKY

OWENSBORO, Ky., Nov. 18.—Only six wells were completed in western Kentucky during the past week, of which five were dry holes. A recompletion, Ohio 1 Lee Murray, 1 mile south of Glenville in McLean County, has opened a new pool in the McClosky at 1,719-31 ft. The well was deepened from former total depth of 1,420 ft. and made 100 bbl., natural. The operator will probably acidize.

Daviess County

Utica dist.: Reilly & Smith 1 William Baird, dry through McClosky, T.D. 1,728 ft.
Petroleum Co. 3 Ed Howard, 100 bbl. in 15 hr., McClosky 1,695-1,701 ft.
Handyville dist.: Ohio 8 Steve Coombs, dry through Jett sand, T.D. 1,304 ft.
Master 10 E. W. Richmond, cleaning out, 80-qt. shot, Jett sand 1,164-89 ft.
Ohio 9 Steve Coombs, location.
Cane Run School dist.: Mecca 11 Zula Johnson, moving in.
Cane Run Petroleum 12 Albert Jackson, abandoned location.

McLean County

South Livermore dist.: O. D. Vickers 1 Inez Everly, dry through Jett sand, T.D. 1,248 ft.
One mile south of Gainesville: Ohio 1 Lee Murray, est. 100 bbl., natural, McClosky 1,719-31 ft., to acidize, old T.D. 1,420 ft.

Ohio County

Pleasant Grove Church dist.: United Petroleum Co. 3 A. I. Miller, dry, T.D. 329 ft.

(Continued on next page)

Fishers Reef Is Added to List Of Galveston Bay Fields

By NEIL WILLIAMS

HOUSTON, Tex., Nov. 18.—The Fishers Reef prospect, offshore from Chambers County in Galveston Bay, was added to the list of producing fields along the Texas Gulf Coast as Humble 2-C-46 State flowed at the rate of 24 bbl. of 32.6-gravity oil per hour through a ¼-in. choke while testing through perforated casing in the Frio sand at 8,961-63 ft. Tubing pressure was 1,500 lb. At the close of the week the well was shut in and a potential test was scheduled to be made. The Frio formation was topped at 7,565 ft., and broken sand and sandy shale showing oil and gas was cored at intervals from 8,712-8,970 ft. Total depth of the well is 9,005 ft.

The well is located approximately 7 miles north of the Red Fish Reef field, and is the fourth test to be drilled on the structure, being about ½ mile northeast of Standard Oil Co. 54 State, and about the same distance northwest of Humble 1-C-45 State, both of which were drilled below 9,000 ft. The completion will no doubt result in an immediate drilling campaign in as much as most of the leases are scheduled to expire early in 1941. Location was made and piling is being driven for Humble 1-45 State, an east offset to the discovery, while Standard Oil Co. of Texas will no doubt start development in tract No. 47 which offsets the discovery to the west. Geologically this area is several hundred feet higher than the Fishers Reef structure on which two wells are distillate producers, and an extremely thick section of Frio sand has been logged in all previously drilled wells.

Red Fish Reef Deep Test

In the Red Fish Reef area, and 1 mile east of the discovery well, Humble 3-A-248 State is coring below 10,419 ft. after additional showings of oil and gas were logged in cores at 10,321-75 ft. This well is considered as having an excellent chance of opening production from a deeper sand as showings of oil and gas were logged the previous week at intervals from 10,004-10,133 ft. To the northeast and located in the Smith Point area, Shell 1-199 State is drilling below 10,510 ft., and looms as a dry hole as it checked approximately 200 ft. low.

West Limit Rowan Field

The Rowan field, Brazoria County, was defined to the west with the abandonment of Texas Gulf Producing Co. 1 Moore. Salt water was recovered on a drill-stem test of the 8,500-ft. discovery pay, and the well was quit at a total depth of 8,975 ft. with no shows reported in the 8,900-ft. gas and distillate sand. On the extreme southeast side of the field, Rowan & Nichols 1 Bradbury was reperforated at 8,957-68 ft., and the well is flowing 6 bbl. of distillate per hour through a 14/64-in. choke.

Fifth Sand in West Ranch

Magnolia 105-A West Ranch, the discovery well of a new sand in the West Ranch field, Jackson County, flowed 617 bbl. of 31-gravity oil per day through a ¼-in. choke under a tubing pressure of 1,090 ft., and casing pressure 1,150 lb. Drilled as an exploratory test to a total depth of 8,528 ft., the hole was plugged back and the completion was made through perforated casing at 6,104-10 ft. This is the fifth producing horizon for the field. The well is northwest of the company's 98 West Ranch, another deep test which tested the same sand, but due to salt-water encroachment the well was plugged back and completed in the 5,700-ft. sand.

Dyersdale Field Defined to North

The Dyersdale field, Harris County, was defined to the northeast by the abandonment of McDannald Oil Co. 1 Chotas, 1,200 ft. from production, which was quit at a total depth of 4,094 ft. The Frio sand was topped low, and abandonment was ordered after two drill-stem tests recovered mud with a slight showing of oil. West of the dry hole, J. M. English 1 Stewart, Lot 15, Block 15, flowed 280 bbl. daily through a ¼-in. choke. The hole is bottomed at 4,081 ft., and the well is producing from only 6 ft. of sand which indicates that the well is near the north edge of the structure. While the well was completed as a flowing well, it will have to be placed on the pump due to the lack of sufficient gas pressure. H. C. Cockburn 4 Burkitt, west of production, is being rigged up to pump after it failed to flow from sand at 4,048-92 ft. The same operator's 8 Burkitt, an east offset to 3 Burkitt, is being completed through perforated casing at 4,068-78 ft.

New Sand at Ogburn

On the extreme northwest side of the Ogburn field, Harris County, L. M. Josey 1 fee showed gas and distillate in a new sand topped at 7,130 ft. and the well is retesting through perforated casing at 6,935-45 ft. This well is located about 1,100 ft. west of Goldston 1 Josey which has crude production from 6,600 ft. depth, and the well was carried deeper after the 6,600-ft. sand carried an odor of distillate and salty taste. South of the discovery well, Christian-Carpenter Drilling Co. spudded 1-A Backen in the J. C. Ogburn Survey.

The Alta Loma field was defined to the northwest with the abandonment of Stanolind 1 Lobit which was quit at a total depth of 9,342 ft. This is the first dry hole to be drilled on the structure, the potentiality of which has been more or less questionable due to the manner in which the field was discovered. The discovery well, 1 J. A. Hulen, blew out and ran wild for several months, and this well is now scheduled for recompletion within the next few weeks as 5½-in. casing was cemented in a redrilled hole at a total depth of 9,197 ft.

Shell 3 Plow Realty Co., 1,500 ft. northeast of the discovery well of the Sheridan field, Colorado County, is coring below 8,529 ft. after drill-stem testing in the Wilcox sand recovered various amounts of oil-cut mud, and tested several hundred pounds working pressure.

McDannald Oil Co. 1 Coline Oil Co., a projected Wilcox test located in the Cold Springs area, San Jacinto County, was being watched with considerable interest as it cores below 7,405 ft. This well is north of Shell 1 Coline Oil Co. a recent dry hole which topped the Wilcox at 7,180 ft. and logged several interesting showings below 7,600 ft.

TEXAS GULF COAST COMPLETIONS

Brazoria County

Hastings field: Stanolind 39-A Curkett, 666 bbl., ¼-in. choke, top sand 5,938 ft., T.D. 6,088 ft.
Old Ocean field: Sun 6 McCampbell, 423 bbl., ¼-in. choke, perf. casing 10,090-10,140 ft., T.D. 11,040 ft.
Rowan field: Texas Gulf 1 Moore, dry, T.D. 8,975 ft.
West Columbia field: Hogg Oil Co. 13 Hogg, 205 bbl., ¼-in. choke, top sand 5,572 ft., T.D. 5,588 ft.

Fort Bend County

Thompson field: Gulf 5 Scanlan, 819 bbl., ¼-in. choke, top sand 7,881 ft., T.D. 7,895 ft.
Gulf 20 Wolters, 55 bbl., ⅛-in. choke, perf. casing 5,430-40 ft., T.D. 5,450 ft.

Galveston County

Alta Loma field: Stanolind 1 Lobit, dry, T.D. 9,342 ft.

Harris County

Dyersdale field: J. M. English 1 Stewart, 280 bbl., ¼-in. choke, top sand 4,058 ft., T.D. 4,081 ft.
McDannald 1 Chotas, dry, T.D. 4,094 ft.
Tomball field: Humble 6-B Kobs, gas well, T.D. 5,631 ft.

Jackson County

Lolita field: Humble 2-C L. Ranch Co., 600 bbl., ¼-in. choke, T.D. 5,940 ft.
West Ranch field: Humble 11 Toney, 555 bbl., ¼-in. choke, top sand 5,731 ft., T.D. 5,725 ft.
Magnolia 105-A West Ranch, 617 bbl., ¼-in. choke, perf. casing 6,104-10 ft., T.D. 8,528 ft.
Phillips 2 Seidel, 539 bbl., ¼-in. choke, perf. casing 5,604-14 ft., T.D. 5,830 ft.

Jefferson County

West Beaumont field: Stanolind 13 Keith & Dowlen, 277 bbl., ⅛-in. choke, sand 5,365-79 ft., T.D. 5,380 ft.

Liberty County

Hull field: South Oil Co. 1 Palmer, 202 bbl., ⅛-in. choke, top sand 3,124 ft., T.D. 3,263 ft.

Matagorda County

Van Vleck field: Skelly 8 Moore, 417 bbl., ⅛-in. choke, top sand 7,478 ft., T.D. 7,495 ft.

Tyler County

Joe's Lake field: Republic 46 Hurd, 415 bbl., ¼-in. choke, top sand 7,679 ft., T.D. 7,706 ft.

Wharton County

Hillje field: Texas 1 Schulze, dry, T.D. 5,240 ft.
Withers field: Pan American 4 Halamicek, 35 bbl., 4/64-in. choke, top sand 5,536 ft., T.D. 5,543 ft.
Texas 64-B Pierce, 85 bbl., ⅛-in. choke, top sand 5,308 ft., T.D. 5,337 ft.
Texas 83-C Pierce, 124 bbl., ⅛-in. choke, top sand 5,350 ft., T.D. 5,375 ft.
Texas 63-B Pierce, 109 bbl., ⅛-in. choke, T.D. 5,382 ft.
Texas 84-C Pierce, 44 bbl., ⅛-in. choke, top sand 5,294 ft., T.D. 5,380 ft.
Texas 20-A Thompson, 68 bbl., ⅛-in. choke, top sand 5,524 ft., T.D. 5,544½ ft.

TEXAS GULF COAST DRILLING REPORT

Brazoria County

J. A. Gray 1 Ransom, 3 mi. NE of Sandy Point field, prepare to spud.
Humble 2 Hubbard, Rowan field, drilling shale and lime 5,220 ft.
Phillips 1 Houston Farms Development Co., Chocolate Bayou field, drilling shale 9,845 ft.
Phillips 1 Triangle Dev. Co., Chocolate Bayou field, drilling shale 9,956 ft.
Skelly 1 R. D. MacDonald, 3 mi. SE Pledger field, S.D. 8,115 ft., high water.

Galveston County

Maco Stewart 1 Stewart Title & Guaranty Co., north of Hitchcock field, drilling sandy shale 6,345 ft.

Matagorda County

Helmerich & Payne 1 Herman, Sugar Valley prospect, sidetracked at 7,497 ft., drilling back into old hole, stuck drill stem.
Ohio 1 Blackburn, Sugar Valley prospect, T.D. 8,875 ft., reaming.

Montgomery County

Superior 1 T. A. McWhorter, T. J. Nichols Sur., drilling shale 7,245 ft.

Kentucky Fields

(Continued from preceding page)

A. Grewe et al 1 I. H. Whittinghill, dry, T.D. 310 ft.
Highland School dist.: L. M. Steele 6 Arch Cooper, abandoned location.

EASTERN KENTUCKY

ASHLAND, Ky., Nov. 18.—Completion of two oil wells forms the report of operations in eastern Kentucky this week. Attention is still directed on proposed deep-drilling operations while other activities remain on the same general level.

C. J. Sipple & Co. completed 10 William Salyer, on Birch Branch in the Burning Fork district of Magoffin County, at a total depth of 1,175 ft. The well has a showing of 4 or 5 bbl. and will not be shot for a few days as natural tests continue.

A well has been drilled in on the Harris heirs' land at Sta Camp in Estill County, at a total dtph of 875 ft. with the well making 7 bbl. The operator was not named in the report.

The deep-test operation, Cumberland Petroleum Co. 44 L. C. Bailey, 2 miles west of Oil Springs in Magoffin County, has reached a depth of 2,855 ft. with no showing as yet.

Incorporation of the Berea Union Oil & Gas Co. of Ashland, report of which has been received from the state capital, again turns the spotlight on the recent Greenup County completion. The company was incorporated by W. R. Foreman, Robert MacKenzie, and N. W. Dendy of this city and is capitalized at $100,000. Mr. Foreman, operator in the well recently drilled in and estimated by him as an 8 to 10-bbl. producer, said that the company has considerable acreage under lease and expects to develop it extensively, with two more wells to be started soon.

It is known here that quite extensive leasing has occurred in the Greenup County area recently.

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Among the Drilling

ABBOTT & TRAXLER, of Corpus Christi, Tex., are moving a rotary to San Patricio County for their 1 W. W. Toland, a projected 7,000-ft. test located about 2½ miles northeast of the town of Gregory, Tex.

HENDERSON COQUAT, San Antonio, Tex., is rigging up in San Patricio County, Texas, for his 1 Charles Menger, a 6,000-ft. wildcat located about 9 miles east of Mathis. In the Ben Bolt field, Jim Wells County, a new sand was opened ½ mile east of production with the completion of Early Callaway 1 Smith, completed in a shallower sand at 4,800 ft.

LOFFLAND Brothers are moving in on the Fohs Oil Co. 1 Batson-Hatten, a deep Perry County, Mississippi, wildcat, approximately 4 miles east of the operator's 1 Bond Lumber Co., recently carried to 7,500 ft.

MORRIS HAMILTON Drilling Co., Houston, Tex., drilling for W. R. Davis Co., Inc., in the Weser area of Goliad County, Texas, has apparently opened the first crude production in the area as 1 Albrecht showed pipeline oil in the Cook Mountain sand at 5,200 ft.

RHODES Drilling Co., Abilene, Tex., together with A. R. Foster, is indicating the discovery of a new Palo Pinto lime field in Callahan County, West Central Texas. The two operating firms' 1-A N. M. George, wildcat located 4 miles east of Baird, found the top of the lime at 2,139 ft. and encountered heavy volumes of gas and some oil in penetrating 2 ft. Being carried ahead to 2,147 ft., more saturation was logged and testing was under way last week.

TRINITY Drilling Co., Dallas, Tex., has staked an east-side outpost test to the North Cowden field of Ector County, West Texas. It is on acreage recently farmed out from Continental Oil Co. and is to be 2 Kloh, located 470 ft. from the west line of the lease and 1,100 ft. south of the operator's No. 1, in Section 19, Block 42, Township 1s, T.&P. Survey.

ROWE BROTHERS, Inc., drilling contractors of Wichita Falls, Tex., are preparing to spud for Chapman & McFarlin, Tulsa, an outpost test to the new two-well field just east of Nocona in Montague County, North Texas. It will be the Tulsa operator's 1 C. P. Dodson, southwest corner of a 60-acre lease in the T. R. Jackson Survey. It is the third test for the field which was opened by Sinclair Prairie 1 Benton and only a few weeks ago extended slightly by Stanolind 1 Dodson.

AL BUCHANAN Drilling Co., San Antonio, Tex., is preparing to move a rotary to the Agua Dulce field, Nueces County, Texas, for 1 J. A. Whitworth, which will be drilled for Mills Bennett Production Co. The latter company purchased 293 acres in the field, and several wells are scheduled to be drilled.

E. C. JOHNSTON is the drilling contractor on the City of Jackson 1 fee, a test in Hinds County, Mississippi, projected for the gas sand in the declining Jackson gas field.

WIEGAND BROTHERS, San Antonio, Tex., started drilling operations on G. B. White 1 Poetter, a wildcat test located ½ mile northwest of the Slick field, Texas.

CROSBY Drilling Co., Houston, Tex., drilling for M. McMurray in Lavaca County, Texas, on the Allen and Miner lease, is shut down at a total depth of 7,585 ft.

T. A. CARLTON, Houston, Tex., continues to test L. M. Josey 1 fee in the northern part of the Ogburn field, Texas, and the well has shown promise of opening gas and distillate production from a deeper sand below 7,000 ft.

DELTA Drilling Co., Shreveport, La., is drilling two important wildcats of its own in North Louisiana. The 1 Dunn, near Greenwood, Caddo Parish, is below 2,370 ft., and the 1 Hughes, 5 miles southwest of Summerville and 6 miles northwest of Nebo, is coring below 2,570 ft.

W. J. WALTON received contract from Producers Corp. of Nevada for 1 McKnight-Bennett, a wildcat located in the Carrizo Springs area, Dimmitt County, Texas.

McDANNALD Oil Co., Houston, Tex., abandoned 1 Chotas in the Dyersdale field, Harris County, Texas, and in the Cold Springs area, San Jacinto County, 1 Coline Oil Co., a projected Wilcox test, is coring below 7,405 ft. and should reach its objective within the next several days.

TRINITY DRILLERS, Inc., San Antonio, Tex., is attempting to open a new field in the Rio Grande Valley district as a series of production tests are under way at Pan American

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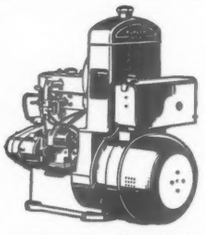

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The Oil and Gas Journal
Tulsa, Oklahoma

Production Co. 1 Garcia, 14 miles east of Lyford in Willacy County, Texas. It is being tested through a series of perforations at intervals from 7,620-78 ft., and the well has made an unestimated amount of oil while flowing by heads.

J. F. McCOLE, Hutchinson, Kans., drilling contractor, is using cable tools at C. E. Olsson 1 Anderson, 1-7s-8e, wildcat in Pottawatomie County, Kansas. He has the contract for a 4,000-ft. test, with an interest in the well. Location is on a 27,000-acre block, and is 60 miles southwest of Falls City, Neb., nearest production. It is between the Nemaha granite ridge and the Abilene anticline.

J. E. BRANTLEY, of Drilling & Exploration Co., Los Angeles, Calif., and Dallas, Tex., was elected president of American Association of Oil Well Drilling Contractors at Chicago last week. Harry Edwards, Houston, Tex., is vice president at large; W. S. Churchill, Arrow Drilling Co., Tulsa, vice president of rotary division; J. J. Klise, Wooster, Ohio, vice president of cable-tool division; C. J. Paine, of F. B. Paine Drilling Co., Dallas, Tex., secretary-treasurer.

BELL & LOFFLAND, Los Angeles, Calif., drilling contractors, have been awarded contract for drilling a wildcat approximately 12 miles southeast of Sacramento, in Sacramento County, California, and at last reports was erecting derrick. The test will be Independent Exploration Co. 1 Perry. in 19-7n-6e. Independent has 6,500 acres under lease and is drilling on assumption that the same geological section is present in this area from which production is obtained in the Coalinga area.

TAFT Well Drilling Co., Taft, Calif., at Standard Oil Co. of California 1 Tippetts, in Yolo County, California, is drilling below 2,264 ft. in sandy shale. The test is located in 9-12n-3w, on a structure formerly known as Nigger Heaven dome. Surface pipe (13⅜-in.) was cemented at 1,104 ft.

SNYDER & GWIN, drilling contractor of Illinois, at a well being drilled for Paul Rossi, has rigged up cable tools for deepening from Devonian at 3,432 ft. to Trenton. The well is the 8 Brooks, in SW NE SW 29-2n-2e, and will be the first Trenton test in the Lake Centralia-Salem, Illinois, field. Contract is 4,600 ft.

TURNER Petroleum Corp., Mount Pleasant, Mich., has acquired all outstanding stock of its subsidiary, the Snyder Drilling Co., as of November 1, it was announced by officials of the production company last week. The name of the drilling company has been changed to the Turner Drilling Co. and will be operated as a wholly owned subsidiary by the Turner Production Corp.

E. C. NORWOOD, drilling contractor of Wichita Falls, Tex., has spudded and is drilling below surface pipe at a deep 6,500-ft. test for Bruce Sullivan, Fort Worth. It is 1 Putnam, Gilbert Survey, 5 miles north of the city. It is one of the farthest south wildcats started in the Texas Fort Worth basin play.

Crew of McCarthy Drilling Co., Houston, Tex., which established a new producing and drilling record for the upper Texas Gulf Coast with the completion of the company's 1 Munson at Bailey's Prairie, Brazoria County: Floyd Anderson, Fred Duhon, William Parks, Hailey Matthews, crew members; Luby Martin, engineer for the Houston Oil Field Materials Co.; Joe Fontaine, driller; Louis Baker, superintendent, and Buck Rothwell, toolpusher

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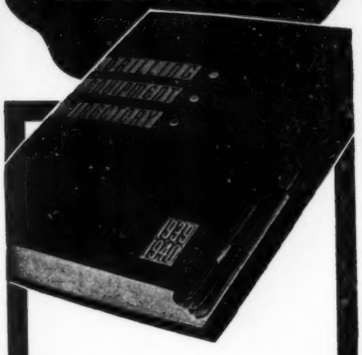

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THE OIL AND GAS JOURNAL
Tulsa, Okla.

Big Gas Wells Completed in Clare and Osceola Counties

By OTTO C. PRESSPRICH

SAGINAW, Mich., Nov. 18.—Michigan oil and gas-test completions were reported last week from 13 counties as widespread search for new fields continued. Results were: 10 producers of from 3 to 250 bbl. a day, for new initial potential of 927 bbl.; 4 new gas wells aggregating 24,727,000 cu. ft. a day; 12 dry holes; 1 abandoned location.

There was some concentration of interest on progress of drilling in Michigan's Thumb section. Operators were awaiting results from Gordon Oil 1 Gainer in Section 28 of Bloomfield Township, Huron County, nearing Monroe formation testing stage near 2,500 ft. Intended first as a shallow Traverse test, it was deepened when no results were obtained.

The Bloomfield area has been the scene of considerable exploration since last summer when a promising test was recorded. The initial test, however, was finally listed on completion records last week as a dry hole after various efforts to develop it as a commercial well resulted only in the recovery of around 500 bbl. of crude.

Also watched was the possibility of a new district for crude in Winterfield Township of Clare County where a good show of oil was being obtained by Rowmor Corp. and Dan Hughes from 1 Wyman in Section 29. The test has been acid treated but the operators were considering whether to deepen the hole, reacidize, or continue pumping tests. The well was reported to have filled naturally to about 2,500 ft. with oil. The well is 7 miles north of the Redding pool, 3 miles west of the Sun Oil Co. Winterfield discovery pumper in Section 35. Depth of the Wyman test was 3,763 ft.

MICHIGAN CRUDE-OIL RUNS

(Daily average for October 1940)

Pool—	Wells	Runs
Porter-Yost	340	4,872
Greendale-Chippewa	178	1,257
Geneva-Midland	2	0
Sherman-Isabella	61	1,171
Vernon-Leaton-Denver	76	662
Wise-Isabella	55	2,070
Freeman-Redding	145	10,857
Hamilton-Clare	1	15
Winterfield-Clare	1	29
Grant-Clare	3	2
Beaverton	21	524
Edenville	26	246
Grout-Gladwin	2	31
Bentley-Gladwin	35	308
Buckeye-Wicklund-Oard	291	2,236
Ogemaw	230	1,193
Secord-Gladwin	2	0
Adams-Arenac	21	1,915
Clayton-Arenac	51	1,147
Tuscola	4	0
Saginaw-Bay area	56	97
Birch Run	25	22
Dundee-Monroe	13	284
Montcalm County	34	242
Allegan-all pools	494	7,848
Holland-Zeeland	3	13
Muskegon	57	83
Walker-Wyoming-Tallmadge	442	7,414
Van Buren-all pools	281	2,824
Barry County	1	0
Total	2,951	47,362

American Drilling Co., at 1,790 ft. with its 1 Cornwell ranch wildcat in Section 8 of Clare's Arthur Township, was planning a switch to cable tools for continuance to the Dundee, and Ohio Oil Co., wildcatting in Section 16 of Clam Union Township, Missaukee County, was drilling below 3,800 ft.

There were prospects of a revival in Ottawa County's Tallmadge Township district as the result of completion of the Strom 1 Zawadski in Section 34. The well flowed 230 bbl. a day, after acid. However, Smith Petroleum Co. 8 Fenske, in the same section, made only 25 bbl. after acid. In Kent County Miller & Fothergill 1 Parker wildcat in Section 16, Nelson Township, was under test near 3,000 ft. An oil show was encountered in the Traverse. The Van Buren County activity was confined to completion of two tests as dry holes, one well—the state's best of the week—making 250 bbl. a day, after acid.

While Socony-Vacuum 1 Dekos in Adams-Arenac was dry in Section 16, Pure Oil Co. expected a commercial well in Section 22 when its 1 Ostresky, first well south of the Yenior discovery, had a good show of oil just below 3,000 ft., more than 100 ft. in the Dundee.

Of note in Gladwin and Isabella counties were two tests: Sun Oil Co. 1 Goodwin, in Section 36, of Beaverton, Gladwin, swabbed about 100 bbl. and will be acidized. Leuder 1 McClintic in Section 3 of Broomfield, Isabella, was good for 110 bbl. a day, after acid, and Pure Oil Co. 17 Wille in Section 4, Broomfield, now at 3,630 ft., is to be deepened. There was a good oil show, but first acidizing efforts were unsuccessful.

Headlining natural-gas development was Taggart Brothers' announcement, without details, of the opening of what they believe to be a new field in Lincoln Township, Osceola County. Estimated daily capacity of a new well was announced as 7,500,000 cu. ft. The firm reported it has 20,000 acres under lease and plans extensive spring operations. In addition Taggarts also completed last week a 11,350,000-cu. ft. well in Osceola's Marion Township and one for 10,450,000 cu. ft. in Lincoln of Clare. In Gratiot County, a V. R. Wilson-Twin Drilling Co. gas test was halted as a dry hole in North Star Township.

Last week the state Conservation Department issued 17 drilling permits, bringing the total for the year to 991. The franchises went: Six to Allegan County, four to Van Buren, two to Kent, one each to Midland, Arenac, Bay, Ottawa and Muskegon.

October gave indication that the steady decline in Michigan oil production may be about ended. The month's total was 1,468,222 bbl., a slight gain over September, because of the 31-day month. The daily average, however, was down only 82 bbl., which was much less than the usual amount for preceding months this year. Increased production in Allegan County and development of the new Adams pool virtually offset losses in other fields.

MICHIGAN COMPLETIONS

Allegan County

Heath Township: W. Spencer Cook 1 Clark, NW NE NE 22-3n-14w, dry, T.D. 1,571 ft.
Overisel Township: H. C. Nelson 1 Poelakker, SE SE NW 9-4n-14w, dry, T.D. 1,501 ft.
Regal Dutch Petroleum Co. 2 B. Kroeze, SE SW NW 16-4n-14w, 82 bbl., acid, T.D. 1,524 ft.
Gordon Oil Co. 5 Koopman, NE NE NW 16-4n-14w, 126 bbl., acid., T.D. 1,493 ft.
Salem Township: Lang & Lewis 1 Loew et al, communitized, SW SW NW 15-4n-13w, dry, T.D. 1,608 ft.
Michigan Devonian Petroleum Co. 1 E. Smith, SW SE NW 15-4n-13w, 47 bbl., acid, T.D. 1,602 ft.

Arenac County

Lincoln Township: Socony-Vacuum 1 Dekos, S½ NE SE 16-18n-4e, dry, T.D. 2,904 ft.

Cass County

Ontwa Township: M. L. Morton 1 W. and J. Huffman, SW NE NE 22-8s-15w, dry, T.D. 664 ft.
Silver Creek Township: Silver Creek Oil Co. 3 Flynn, NE SW NW 23-5s-16w, 3 bbl., acid, T.D. 807 ft.

Clare County

Lincoln Township: Taggart Bros. 54 Tompkins-Frackelton, C NE 17-18n-5w, 10,450,000 cu. ft. gas, T.D. 1,544 ft.
Redding Township: Pure Oil Co. 5 F. O. Switzer, SW SE SW 27-19n-6w, 617,000 cu. ft. gas, T.D. 1,499 ft.

Gratiot County

North Star Township: Vic R. Wilson and Twin Drilling C 1 Miller-Cook, C NW 3-10n-2w, gas test, dry, T.D. 902 ft.

Huron County

Bloomfield Township: Fortney Oil Co. 1 McDonald, SW NE NE 20-17n-14e, dry, T.D. 1,427 ft.
Basin Oil Co. 3 Woodke, SE SW SE Sec. 17, dry, T.D. 1,450 ft.
Gordon Oil Co. and Basin Oil Co. 1 Rankin, NE SW NW Sec. 20, location abandoned.

Kent County

Walker Township: Smith Petroleum and Strom-Wagner 1 J. & F. Milan, S½ SW SE 28-7n-12w, dry, T.D. 1,943 ft.

Isabella County

Broomfield Township: Richard Lueder 1 Bartlett-McClintic, NE NW SW 3-14n-6w, 110 bbl., acid, T.D. 3,604 ft.
Wise Township: Cities Service Oil Co. E-1 Gas Well unit, NW SE SE 8-16n-3w, 3,310,000 cu. ft. gas, T.D. 1,262 ft.
Cities Service F-1 Gas Well unit, NW SE SW 28-16n-3w, dry, T.D. 1,322 ft.

Mecosta County

Deerfield Township: Richard Erlewine 1 Mont Sams, SW NE SW 9-13n-9w, dry, T.D. 3,679 ft.

Midland County

Porter Township: Pure 1 Mitchell et al S½ SW SE 10-13n-1w, 35 bbl., acid, T.D. 3,405 ft.

Osceola County

Lincoln Township: Weber Oil Co. 1 L. Gabel, NE NE SW 31-18n-10w, 29 bbl., acid, T.D. 3,635 ft.
Marion Township: Taggart Bros. Co. 53. Williams and Federal Land Bank, C SW 36-20n-7w, 11,350,000 cu. ft. gas, T.D. 1,390 ft.

Ottawa County

Tallmadge Township: E. B. Strom, Tr., 2 Zawadski, NE SW NW 34-7n-13w, 230 bbl., acid, T.D. 1,813 ft.
Smith Petroleum Co. 8 R. Fenske, NW NE NW 34-7n-13w, 25 bbl., acid, T.D. 1,837 ft.

Van Buren County

Bloomingdale Township: Clapsaddle & Harris 1 Remington, SW SE SW 10-1s-14w, 250 bbl., acid, T.D. 1,257 ft.
Clapsaddle & Harris 2 Peavey, SE NE NE Sec. 15, dry, T.D. 1,299 ft.
Hamilton Township: Hugh H. Heinig 1 Miller, C S½ SW NW 21-4s-15w, dry, T.D. 951 ft.

North Louisiana-Arkansas

(Continued from Page 60)

T. B. Donnell 1 Ida Barr ..... John Reeves Sur. Dry, T.D. 2,419 ft.

Wildcat—Sabine County

Sterm & Womack 1 Kieth ..... L. Grace Sur. Dry, T.D. 6,173 ft.

EAST TEXAS BORDER DRILLING REPORT

Bowie County

Lee Timberlake et al 1 Smith..... T. H. Hill Sur. S.D. 2,990 ft., repair rig.

Shelby County

Paul Pewitt 1 J. S. Swan.....Anna Gray Sur. S.D. 5,105 ft.
Superior Oil Co. 4 Pickering Lumber Co. ..... W. J. Crane Sur. Old T.D. 2,610 ft., reset 9⅝-in. casing 280 ft.

ARKANSAS DRILLING REPORT

Clark County

Coker Oil Corp. 1 Guess ..... NE SE NE 2-11-20 T.D. 612 ft., est. 75 ft. fluid in hole, waiting on standard rig.
W. P. Wilson 1 Hamilton-Mathews....NW SW 32-10-20 S.D. 1,572 ft., engine repair.

Dallas County

H. H. McBride et al 1 Southern Kraft Corp. SE SW 16-9-16 S.D. 1,463 ft.

Hempstead County

S. H. Cadenhead et al 1 J. J. Bruce .SE SE 27-10s-24w S.D. 206 ft.

Lonoke County

Lunnon Howell & Ford 1 City of Cabot..... Lot 1, Blk. 6 18-4n-9w Drilling 1,338 ft.
J. F. Russell 1 J. T. Gunter.....SE SE 17-5n-10w S.D. 2,785 ft.

Nevada County

Coker Oil Corp. 1 B. Jones.....NE SE 2-11-21 Drilling 1,233 ft., show of oil.

Prairie County

Hazel Oil Co. 1 Fidelity Mutual Life Ins. Co. ..... NE NE SW 16-2n-6w 8½-in. casing 282 ft., S.D. 325 ft.

Saline County

A. W. Givens 1 Williams.....NW NE NE 18-3s-15w Fishing, T.D. 690 ft.
Tedford Drlg. Co. 1 Cunningham..SW NE 31-3s-15w Set 10-in. casing 331 ft.
Tedford Drlg. Co. 1 Williams.....31-3s-15w S.D. 507 ft.

St. Francis County

U. S. Oil Corp. 1 Wilford .... NE SE NE 29-4n-1w T.D. 910 ft., prepare recement 10¾-in. casing.

Union County

C. H. Murphy, Jr. 2-B Cates .....S½ NW NW 33-18-15 7-in. casing 2,125 ft., will drill in with cable tools.

Appalachian Fields

(Continued from Page 70)

Washington County

Amwell Township: Chivers et al 2 James Bristor, 1,813 ft.
Carnegie 4 Redd, 2,823 ft.
Carnegie 1 D. C. Blake, building rig to deepen.
Morris Township: South Penn 1 Oliver Booth, 1,025 ft.
Somerset Township: Carnegie 1 Elizabeth Nicholl, drilling deeper from 1,425 ft., now 1,605 ft.
Carnegie 1 J. D. Amos, 240 ft.
Equitable 1 Riffle, 1,600 ft.
West Bethlehem Township: Carnegie 3 Chartiers Southern R. R. Co., location.
J. D. Amos et al 1 Frank Myers, 380 ft.
George Gray et al 1 Harry Long, 2,689 ft., shut down for repairs.

Westmoreland County

Allegheny Township: Appollo Gas Co. 2 Sadie Anderson, 715 ft.
Bell Township: Peoples 1 J. A. Kuhns, 3,010 ft.
Washington Township: Peoples 1 J. T. George, S.D. 300 ft.

Weser Wildcat, Goliad County, Has Show in Cook Mountain

By F. L. SINGLETON

CORPUS CHRISTI, Tex., Nov. 18.—Interest in the Southwest Texas district the past week was held by W. R. Davis Co., Inc., 1 Albrecht in the Weser area, Goliad County, which is showing promise of opening important production from the Cook Mountain formation. Other developments of interest included a new sand discovery in the Ben Bolt field, and a new producing area for the Wade City-Orange Grove sector in Jim Wells County.

W. R. Davis Co., Inc., 1 Albrecht, Weser area, Goliad County, perforated casing in the Cook Mountain sand at 5,246-52 ft. and the well flowed at the rate of 5 bbl. of pipe-line oil per hour through ⅛-in. choke. Tubing pressure was 375 lb. and casing pressure 600 lb. The well flowed for several hours and then sanded up. At the close of the week the hole was being swabbed in an attempt to revive the flow. Casing was cemented for completion following a drill-stem test at 5,242-55 ft. which recovered 950 ft. of pipe-line oil. The well is located in the Thomas Hancock Survey, just northwest of Steinberger 1 Albrecht which was completed as a distillate producer in the same sand.

New Production Near Orange Grove

A new producing area 3 miles east of the Orange Grove townsite, Jim Wells County, was opened as H. R. Smith 1 Kohler was flowing an unestimated amount of oil and wash water while cleaning out from perforated casing at 4,863-75 ft. This well was drilled to total depth of 5,800 ft. and 5½-in. casing was cemented at 5,110 ft. Location is in Block 3 of the Casa Blanca grant. Production is from the Frio-Vicksburg formation. Protection in the area is held by numerous independent and major companies, and an active development program is anticipated.

Henshaw Brothers 1 Boerner, due west of the discovery well of the Henshaw field, Jim Wells County, is flowing gas and distillate through a 7/64-in. choke, while testing through perforated casing at approximately 5,133-35 ft. The well failed to find saturation in the discovery horizons, and was drilled to a total depth of 5,885 ft., before the hole was plugged back to 5,150 ft.

New Sand in Ben Bolt

A new sand discovery on the east side of the Ben Bolt field is expected to revive development in this field. Earl Callaway 1 M. W. Smith, ½ mile east of production, is being gaged after it flowed an unestimated amount of oil and wash water while testing sand at 4,863-75 ft. The completion opens production from a new sand in the Frio section several hundred feet higher than the discovery Vicksburg pay at 5,200-5,300 ft.

In the South Clara Driscoll field, Nueces County, Texas Conservative Oil Co. 5-B Flynn was reported to be flowing pipe-line oil from a new sand, but no gage was available. Drilled to a total depth of 6,000 ft., production was obtained by perforating casing at 5,825-36 ft. Location is in Section 110, George H. Pauls subdivision of the Driscoll ranch.

Stratton Field Extended

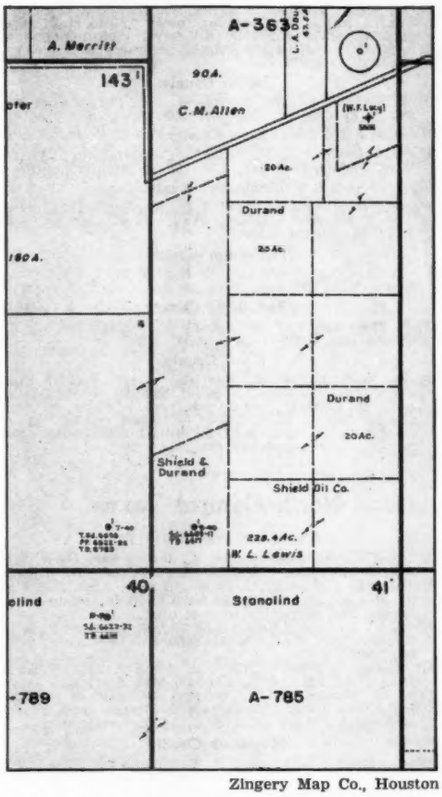
Oil production on the east flank of the Stratton field, Nueces County, was further extended with the completion of Bay-Tex Oil Corp. 5 Union Central Life Insurance Co., which flowed 171 bbl. per day through a ⅛-in. choke from perforated casing at 6,549 ft. The sand section was topped at 6,545 ft.

Additional development in the Agua Dulce field, Nueces County, was expected to get under way in the near future by the purchase of 128 acres of semiwildcat acreage northeast of the field. The acreage was purchased by John F. Camp for a consideration of $38,400 of which $12,800 was in cash and $200 an acre out of one-eighth of the royalty.

New Pay in Shield

In the Shield field, Nueces County, Shield Oil Co. 1 Allen, which opened distillate production from a new sand about 4,700 ft. north of production, flowed 43 bbl. of distillate in 12 hours through a 7/32-in. choke with tubing pressure 2,525 lb. and casing pressure 2,600 lb. The well is producing from perforated casing at 6,970-74 ft.

Location for an interesting wildcat for San Patricio County was made by Abbott & Traxler, 2½ miles northeast of the town of Gregory. The well is located on the W. W. Toland lease, Lot 14, Coleman Fulton Pasture Co. lands subdivision. The area has been worked with geophysical instruments and protection acreage is held by numerous independent companies. Six miles due east



Zingery Map Co., Houston

Shield Oil Co. 1 Allen which opens distillate production from a new sand in the Shield field, Nueces County

of Mathis, Henderson Coquat is moving in for 1 Menger, Section 1, Pauls subdivision of the J. J. Welder ranch.

The newly opened Washburn field, La Salle County, was given a setback with the abandonment of H. R. Cullen 2 Washburn, 4,500 ft. northeast of the discovery well. The well checked structurally low to the discovery well, encountering only slight shows in the Wilcox, and the well was abandoned below 5,400 ft.

Pan American and Shell 1 Garcia, a wildcat located 14 miles east of Lyford, continues to attract attention as it tests through perforated casing at 7,644-50 ft., 7,668-78 ft., and 7,620-34 ft. During the week the well flowed by heads at the rate of 5 bbl. of oil per hour through the drill stem and at the close of the week 2½-in. tubing was scheduled to be set for completion.

SOUTHWEST TEXAS COMPLETIONS

LOWER GULF COAST DISTRICT

Calhoun County

Heyser field: Gulf 44-B Traylor, 86 bbl., 3/32-in. choke, sand 5,478-90 ft., T.D.

Jim Wells County

East Alice field: Bryant & Saner 2-A Ingram, dry, T.D. 5,186 ft.

E. L. Anderson 1 Muil, dry, T.D. 5,758 ft.

Nueces County

Clara Driscoll field: Texas 1 Taylor, 113 bbl., ⅛-in. choke, perf. casing 5,244-52 ft., T.D. 5,456 ft.

East Flour Bluff field: Humble 4-D State, 181 bbl., ⅛-in. choke.

Humble 2-E State, 171 bbl., ⅛-in. choke, T.D. 6,796 ft.

South Clara Driscoll field: Wellington 13 Dugger, 34 bbl., 9/64-in. choke, perf. casing 5,700-03 ft., T.D. 6,608 ft.

San Patricio County

East White Point field: Plymouth 2 Solar-Morgan, 124 bbl., 7/64-in. choke, perf. casing 5,679-83 ft., T.D. 5,684 ft.

LAREDO DISTRICT

Duval County

Cedro Hill field: Magnolia 6 Duval County Ranch Co., dry, T.D. 1,466 ft.

Driscoll field: Continental 57-A Driscoll, dry, T.D. 3,859 ft.

Lundell field: Magnolia 14 Duval County Ranch Co., 20 bbl. oil and 20 bbl. salt water, pumping, sand 1,521-26 ft., T.D.

Magnolia 16 Duval County Ranch Co., dry, T.D. 2,277 ft.

Government Wells Oil Co. 48 Lundell, 59 bbl., 12 hr., ⅝-in. choke, sand 1,513-22 ft., T.D.

Wildcat: Magnolia 4 Duval County Ranch Co., dry, T.D. 2,555 ft.

W. C. McBride 1 Drought, dry, T.D. 1,251 ft.

Jay Simmons 1 Pena, dry, T.D. 3,172 ft.

Hidalgo County

Samfordyce field: Phillips 1 Villareal, 60 bbl., ⅛-in. choke, perf. casing 4,100-05 ft., T.D. 4,200 ft.

Jim Hogg County

Colorado field: C. Andrade 3-F Trevino, 195 bbl., ¼-in. choke, sand 2,914-21½ ft., T.D. 2,934 ft.

Humble 25 King ranch, 128 bbl., 7/64-in. choke, T.D. 3,043 ft.

V. F. Neuhaus, 108 bbl., ¼-in. choke, sand 2,932-46 ft., T.D.

Sun 9 Thaxton, 85 bbl., 7/64-in. choke, sand 2,942-55 ft., T.D.

Manila field: Guy Davis 2 Zachry, 53 bbl., ⅛-in. choke, sand 2,586-90 ft., T.D.

Live Oak County

White Creek field: Coquat, Holland & Smith 2 Goad, 25 bbl., pumping, perf. casing 1,502-12 ft., T.D. 1,530 ft.

McMullen County

Calliham field: Marion Prod. Co. 7-A Lark, 7 bbl., pumping, perf. casing 1,040-44½ ft., T.D. 1,047 ft.

Starr County

North Rincon field: A. Harvey 1 Moore, dry, T.D. 5,017 ft.

Webb County

Bruni field: Highland Oil Co. 7-A Bruni, 40 bbl., jetting, perf. casing 3,375-83½ ft., T.D. 3,398 ft.

Glen field: Transwestern 2 Yeager-Stroman, 126 bbl., 14 hr., pumping sand 2,154-77 ft., T.D.

Mirando Valley field: Jay Simmons 1 Hinnant, dry, T.D. 2,210 ft.

Wildcat: Edwards & Boyd 1 Laurel, dry, T.D. 2,656 ft.

Harvey & Henderson 1 Moglia, dry, T.D. 3,012 ft.

O. W. Killam 1-2 Bruni, dry, T.D. 2,729 ft.

Lee Upton 1 Villareal, dry, T.D. 2,510 ft.

SAN ANTONIO DISTRICT

Atascosa County

Wildcat: D. L. Higgins 1 Shannon, dry, T.D. 1,600 ft.

SOUTHWEST TEXAS DRILLING REPORT

Aransas County

Continental 3 St. Charles Co., St. Charles field, drilling shale 7,668 ft.

Gulfboard Oil Corp. 1-238 State, Aransas Bay, drilling shale 9,210 ft.

Calhoun County

R. N. Ranger et al 1 Stutzenbecker, N of Port Lavaca, E. Hidalgo grant, spudded.

Hidalgo County

Humble 1 American Life Ins. Co., Lot 1, Blk. 13, Missouri-Texas Ld. & Irr. Co. Subd., drilling shale 8,570 ft.

La Salle County

H. R. Cullen 1-B Wildenthal, SW of Cotulla, drilling shale 7,595 ft.

Lee County

Humble 1 Melde, NW of Giddings, L. P. Rucker Sur., drilling shale 3,056 ft.

Fred Pederson 1 Brown, Tangleford area, prepare to perf. casing 7,390-7,400 ft., and test.

Nueces County

F. A. Gillespie 1 Dabney, E of Agua Dulce field, drilling shale 6,327 ft.

Starr County

W. R. Davis Co., Inc., 1 Seyfriedt, Yzaguirre field, T.D. 6,006 ft., 7-in. casing 5,850 ft., testing.

Sun 2 Mateo Saenz, North Rincon area, prepare to drill-stem test 4,895-4,905 ft.

Hawkins Area Gets Second Test Three Miles South of Discovery

By R. MARNE SANFORD

DALLAS, Tex., Nov. 18.—The Hawkins area of Wood County was given its first definite location since the strike was recorded several weeks ago. Limestone County's reported wildcat contracted to the deep Travis Peak zone was definitely located and a wildcat was announced for Freestone County.

General activity in the district was about normal with eight completions for the East Texas field and seven for the East Central counties. Of the seven completions in the central area, only one was an oil well and it only made 35 bbl. daily with 1,200 bbl. of salt water. One of the completions was a salt-water-disposal well in Franklin County's Talco field, three were failures and three were abandoned locations for wildcat tests.

The new Hawkins area test was staked by F. R. Jackson of Longview and S. J. Rotondi of Mount Pleasant, as 1 Cobb heirs, just east of the schoolhouse in the Hawkins townsite. The site is 175 ft. from the east and 85 ft. from the north lines of Block 5, George Brewer Survey. The location is about 3½ miles south of the yet ungaged discovery well, Manziel 1 Morrison. The operators who staked the new location hold townsite lots 1 through 10 and have applied to the Texas Railroad Commission for a special drilling permit for the less than 20-acre tract. The hearing has been set for December 3 and a deal is pending with A. Z. Skeeter, contractor of Kilgore, to drill the test. Meanwhile, at last reports 1 Morrison was attempting to shut off salt water by plugging back and running liner. It is bottomed at a total depth of 4,962 ft.

Limestone County

Definite location has been announced for the Travis Peak wildcat in Limestone County reported last week. It is Dawes Harden and C. S. Ames 1 W. R. Hammond, 3,458 ft. from the southwest and 1,667 ft. from the northwest lines of a 4,000-acre tract in the J. Folk Survey, 1½ miles north of the town of Kosse. Delaney Drilling Co., Ada, Okla., will carry the hole to 6,100 ft. to test the Travis Peak formation of the lower Trinity series of the Middle Cretaceous.

Freestone County

The Keechi district of southern Freestone County appeared in line for a deep 7,000-ft. wildcat test as an acreage deal was consummated the past week. R. T. Myers and E. E. Preston have purchased one-half interest in 1,050 acres of the William Pennman Survey and 440 acres of the W. D. Allison Survey for a reported consideration of $1,000 cash. With the acreage was a drilling obligation to 7,000 ft. when the entire block of 4,000 acres has been assembled.

EAST TEXAS FIELD COMPLETIONS

(One-hour gages)

Gregg County

Longview area: Cities Service 23 Aiken, 84 bbl., tubing, 3,527-3,643 ft.
Pet. Corp. 16 Colburn, 60 bbl., tubing, 3,516-3,608 ft.
Shell 39 Rickey, 60 bbl., tubing, 3,584-3,660 ft.
Potter 2 Dickson, 20 bbl., tubing, 3,540-70 ft.
Kilgore area: Sinclair 25-B King, 50 bbl., 3,416-81 ft.

Rusk County

Joiner area: A. McCutchin 7 Thompson, 20 bbl., 3,515-3,625 ft.
G. Vaughn 13 Thrash, 50 bbl., 3,767-73 ft.

Upshur County

Longview area: Philbro Properties 3 Mathews, 40 bbl., tubing, 3,641-42 ft.

EASTERN TEXAS DRILLING REPORT

Anderson County

R. H. & W. Oil 1 Saunders, 17-acre tract in Joseph Ferguson Sur., in Frankston townsite, 5,000-ft. test, drilling 3,987 ft.
Tex-Harvey Oil 1 Cartmell, 63-acre tract in Blk. 4, E. Ewing Sur., 4 mi. E of Long Lake field, drilling 746 ft.

Fannin County

H. T. Fleming 1 Welch, E. J. Allen Sur., 4 mi. NW Honey Grove, S.D. 1,200 ft.
Damon Oil 1 A. L. Chaffin, SW cor. 85-acre tract, J. Ketcham Sur., 4 mi. NE Bonham, location cleared, prepare move in materials.

Freestone County

J. L. Collins 1 Utley, Claypool Sur., tested 5 bbl. oil then salt water broke in. S.D. 4,506 ft.

Henderson County

L. A. Demer 1 E. F. Bain, 104-acre tract in John Duncan Sur., 3½ mi. N of Bazzette, Woodbine test.

Hopkins County

L. A. Rankin 1 Chapman, Francis Hopkins Sur., preparing to deepen from 3,934 ft. to 6,000 ft., moving in rig.

Kaufman County

T. G. Shaw, trustee, 1 Agnes Wynne, B. S. Newman Sur., 8 mi. E of Kaufman, lower Trinity test, base Massive 6,255 ft., T.D. 6,454 ft., cleaning out to 5,000 ft., conditioning hole to resume drilling, cleaning out to 4,006 ft.

Lamar County

T. M. Parmly 1 C. H. Townsend, J. S. Porter Sur., 1½ mi. N of Chicolo, drilling 1,460 ft.

Leon County

H. W. Hawker 1 C. H. Mills, M. Copeland Sur., 2½ mi. E of Normangee, S.D. 4,365 ft. (corrected depth).

Limestone County

Farrell Drlg. and Gulf Oil 1 F. Bevill, J. H. Murray Sur., 1 mi. SW of Horn, Travis Peak 4,892 ft., S.D. 4,937 ft., curing titles.

McLennan County

E. P. Campbell 1 Stewart, S. Burton Sur., 5 mi. N of Waco, S.D. 360 ft.

Red River County

J. F. Morrissey 1 Tyler, James Miro Sur., 3½ mi. SE of Bogota, 5,000-ft. test, S.D. 2,390 ft.

Wood County

Bobby Manziel 1 F. M. Morrison, James Pollock Sur., 4 mi. N of Hawkins, 10-in. at 100 ft., top Woodbine sand at 4,902 ft., saturated from 4,902-20 ft., well checks 300 ft. high, 5½-in. at 4,898 ft., 15 bbl. of 28-gravity oil recovered on initial tests, P.B. 4,894

(Continued on Page 80)

North Central Texas

(Continued from Page 71)

R. A. Conkling 1 M. Hoofle, A. James Sur., Abst. 318, 3 mi. S of Antelope, 3,500-ft. test, S.D. 3,410 ft., fishing.
Rathke Oil 1 Moseley, J. Harrison Sur., Abst. 259, 6⅝-in. at 4,465 ft., show gas 4,498-4,500 ft., made spray oil and gas, preparing to drill plug.
Hanlon-Buchanan 1 Smith, NW cor. Smith tract in S. H. Tilgham Sur., 8 mi. SW Jacksboro, 3,150-ft. test, drilling 2,970 ft.
K. N. Davies 1 Jones, NW cor. E½ Sec. 2555, T.E.&L. Sur., 1 mi. SE Perrin, 2,500-ft. test, derrick.
Steed & Wilson 1 M. L. Barrey, SW part of S.F.I.W. Sur., Abst. 1562, 3,200-ft. test to Bryson sand, 6⅝-in. at 3,082 ft., show oil 3,095-3,134 ft., testing.

Montague County

Walter Gant 1 Will Laird, R. T. Millard Sur., Abst. 470, 7 mi. W of Sunset, 6⅝-in. casing at 6,641 ft., T.D. 6,651 ft., perf. casing 5,775-5,860 ft., swabbed dry, perf. and squeezed, W.O.C.
T. F. Hunter 1 Fatheree, L. S. Gilliland Sur., 3 mi. W Illinois Bend, 6,000-ft. test, drilling 360 ft.
Benson & Benson 1 Joe Benton, Abel A. Lewis Sur., 2 mi. SE of Ringgold field, location (corrected report).
J. G. Hammond 1 Jester, 84-acre tract in E. Wingate Sur., Abst. 835, 2 mi. W Mallard, 6,500-ft. test, drilling 4,755 ft.

Parker County

Higginbotham 1 Gilbert, T.&P. Sur., Abst. 1958, T.D. 4,800 ft., fishing.

Tarrant County

Bruce Sullivan 1 W. C. Putnam, 200-acre tract in Milley Gilbert Sur., 6,500-ft. test, drilling 600 ft.

Wilbarger County

Charles Barnes and R. A. Andrews 1 Clarida, NE Sec. 97, Blk. 14, H.&T.C. Sur., drilling 1,250 ft.

Wise County

Cranfill & Rogers 1 McKay, Sec. 8, Falls C.S.L. Sur., 7-in. at 5,796 ft., coring pay 5,797-5,858 ft., testing.

Young County

Ben H. Rankin 1 Marry Logan, SW part Blk. 2, J. W. Doty Sur., 8 mi. NE Graham, 2 mi. W Nelson field, small showing oil 3,575-3,600 ft., 5½-in. 3,565 ft., drilling plug and bailed dry, S.D. 3,613 ft.

WEST CENTRAL TEXAS

FORT WORTH, Tex., Nov. 18—Definite opening of a new field in Shackelford County was recorded the past week at a wildcat test which has been in the testing stages for almost a year. Possibility of a new Palo Pinto lime field in Callahan County and the indications of several field extensions in Jones County also drew attention.

The Shackelford County discovery is J. E. Carson 1 R. A. Elliott, 660 ft. from the south and east lines of Section 48, B.A.L. Survey. During the drilling stage about a year ago the test found water in sand from 2,142-46 ft., had a hole full of water in sand at 2,146-65 ft. and encountered a show of oil and gas in sand from 3,615-50 ft. The show was treated with a total of 3,750 gal. of acid and during the past week an official gage was finally made which rated the well good for 20 bbl. daily, pumping. The 12-in. casing is set at 995 ft., 10-in. at 1,710 ft., 8¼-in. at 2,170 ft., 6⅝-in. at 2,956 ft. and the 5-⅛-in. at 3,614 ft. Little development is expected for the area due to the low initial of the discovery well, even after the large acid treatment.

Callahan County

Indicating the opening of a field from the Palo Pinto lime which produces so prolifically in northeastern Jones County, Callahan County had a wildcat preparing to test as the week closed. It is A. R. Foster and Rhodes Drilling Co., Abilene, 1-A N. M. George, located in the NW NW Section 75, B.O.A. Survey, about 4 miles east of Baird. Palo Pinto lime was topped at 2,139 ft. and heavy blows of gas were found in penetrating 2 ft. In coring ahead to a total depth of 2,147 ft. several feet of saturation was reported found. Casing has been cemented on top of the lime and plug is scheduled for drilling early this week.

Jones County

Possibility of a ¾-mile northeast extension for the four-well Akard field of northwestern Jones County was seen at the Ungren & Frazier 1-A Akard, G. Martinez Survey 137. Saturation was logged from 2,126-30 ft. and preparations were under way to complete. The indicated extension is separated from the field by two dry holes which indicates that possibly a low or saddle exists and that production will be developed on both sides of the two failures.

The northeastern corner of Jones County continued to hold attention as a new well was completed in the Olson area and a new location made in the shallow Flippen sand area just north of the Griffin field. The Olson field completion was from the regular Palo Pinto lime horizon and was King Oil 1 Almquist, ¼ mile north of the discovery well. The lime was topped with saturation at 3,210 ft., however, final gages are not available on the well. King Oil will move one location to the east for its next attempt. The field is in Section 189, B.B.B.&C. Survey.

A new wildcat was staked in Jones County during the week by G. M. Gillespie and associates. It is contracted to 2,600 ft. and is located in the NW cor. of Section 53, O.A.L. Survey, about 6 miles west of the Lewis field.

Taylor County

A one-location extension for the new and little developed View field of central Taylor County was indicated at the S. & B. Oil Co. 2 Fain, north offset to the company's 1 Fain, both in the townsite of View. The prospective well is bottomed at 2,367 ft. in saturation and casing was being cemented at the close of the week.

WEST CENTRAL TEXAS COMPLETIONS

Brown County

Misc. field: McCollum & Forber 1 Carson, top Caddo 1,590 ft., dry at 1,700 ft.

Callahan County

Semiwildcat: R. W. Gray and R. C. Granbury 1 Gilliland, dry at 1,876 ft.

Eastland County

Cisco field: Hickok Prod. 2 Wright-Harrell, 8 bbl. oil and 3,000,000 cu. ft. gas, 3,380-97 ft., P.B. from 3,643 ft.

Haskell County

Wildcat: J. C. Hunter 1 A. E. Pardue, SE cor. of S.F. I.W. Sur., top Adams Branch lime 2,860 ft., Palo Pinto 3,393 ft., dry at T.D. 3,518 ft.

Jones County

Misc. field: Humble 5 Graves, 428 bbl. in 8 hr., ¾-in. choke, 2,925-28 ft.

Shackelford County

Wildcat: J. E. Carson 1 R. A. Elliott, 20 bbl. daily, 3,750 gal. acid 3,614-40 ft., located in SE cor. Sec. 48, B.A.L. Sur.
Semiwildcat: J. B. Baker 1-C Nail, Sec. 48, E.T. Sur., dry at 1,167 ft.
Nowell field: Fortex Oil 1 Newell, dry at 1,437 ft.

Taylor County

Wildcat: K. B. Nowles 1 Hardin-Simmons University, SE cor. NW¼ Sec. 36, L.A.L. Sur., dry at 2,002 ft., sulfur water.

By T. R. INGRAM

Wilson Creek Pool in Colorado Gets Mile South Extension

DENVER, Colo., Nov. 18.—The Rocky Mountain area had 16 completions, of which 11 were oil wells and 5 were gas wells, and 16 new operations.

The most important completion was Texas-California 4 Unit in Wilson Creek field in Colorado which made 442 bbl. first 24 hours and extended the field a mile to the south. The only other completion in Colorado was S. W. Pressey 5 Tompkins, Oakview district, for 2 bbl.

Two completions in Lance Creek were Argo 9 Ford for 25 bbl. an hour and Continental 20 Tom Bell for 206 bbl. in 24 hours. Superior Oil No. 4-C in La Barge field made 30 bbl. a day in second sand and Woolf Petroleum No. 8 made 4 bbl. a day in the same field. North La Barge Oil 5 Government made 105 bbl. first 24 hours.

Cut Bank had four completions, Glacier 4 Neill for 132 bbl., A. B. Cobb 1 Tribal-187 for 185 bbl., M. R. Wagner 3 Tribal-175 for 246 bbl., and R. C. Tarrant 3 Hope for 3,000,000 cu. ft. of gas. Kevin-Sunburst had two completions, a small gas well in the Sunburst for Big West 4 Ellingson and a 25-bbl. pumper in Casper T. Olen 11 Engemoen. Best gas well of several completions was Western Natural Gas 3 Townsend in Whitlash field for 6,000,000 cu. ft.

New operations include a shallow well in the Divide Creek district, Montezuma County, Colorado, one in Kirby Creek, Wyoming, one each in La Barge, Lost Soldier, Aspen district in Uinta County, Osage field in Weston County, and in Washakie County. Montana had one new operation in Fallon County, another in Fergus County, five in Cut Bank, and two in Kevin-Sunburst.

COLORADO

Archuleta County

Kendrick Dev. Co. 1 fee . . . . . SE NE SW 36-35n-2w
T.D. 865 ft., fishing for bit.
California-Colorado Oil 2 Macht, NE SW NW 32-36n-1w
T.D. 1,081 ft., setting 10-in. to shut off thin water sand, small shows of gas in Mancos shale from 200 ft. to bottom.

Fremont County

U-Tex Oil 1 Hassler . . . . . NE 28-20s-69w
Drilling 2,450 ft., 5 bbl. a day in bailing test at 2,185 ft.

Garfield County

Joe T. Juhan 1 Clough . . . . . C NW SE 22-6s-94w
Drilling 506 ft. in Wasatch.

Huerfano County

S. W. Pressey 5 Tompkins, NE NE NE 10-29s-69w, Oakview district, was completed at 504 ft. for 2 bbl. a day. It had some gas at 280-320 ft.

I. E. Sideman-White 1 Martinez, C SW NE 33-26s-67w, La Veta district, lost hole at 1,630 ft., skidded rig 10 ft. and is drilling new hole in 1-X Martinez.

Sideman-White 1-X Martinez . . . . . C SW NE 33-26s-67w
Drilling ahead after landing 8¼-in. at 1,400 ft.
S. W. Pressey 4 Ojo . . . . . NW NW NW 11-29s-69w
T.D. 670 ft., preparing to plug back to sand at 105-33 ft., where it tested 2 bbl. a day.
Tompkins & Son 3 Tompkins . . . . . SW SW SW 2-29s-69w
Standing at 1,165 ft., sand at 210 ft. tested 2 bbl. black oil a day.
Ira E. Miller 1 Hamilton . . . . . SE SE NW 20-29s-67w
Drilling 1,800 ft.
R. L. Jewett 1 Valdez . . . . . SE NE 30-28s-67w
T.D. 450 ft., running 12½-in. to set on top of sand at 440 ft. in which show of oil reported.

La Plata County

Nick Spatter 1-X Bryce . . . . . SW SW 31-33n-9w
Drilling below 4,400 ft. in brown and gray sandy shale.

Larimer County

E. P. Gallup 1 Hanson . . . . . C SE NW 36-10n-71w
T.D. 165 ft., small show gas, trying to shut off water with 10-in.

Logan County

West Plains 1 Sheldon . . . . . SE NW SW 3-10n-55w
Drilling 3,190 ft. in sandy shale and lime, carrying 8¼-in. at 3,180 ft.

Moffat County

Steamboat Springs Synd. 1 Sutton, NE NE SW 1-5n-69w
S.D. 2,335 ft. in sand, to run pipe.
Mountain Fuel Supply 6-B Wilson, NE SE 14-12n-100w
T.D. 4,007 ft., P.B. to 3,550 ft. and perf. 7-in., tested 500,000 cu. ft., continuing progressive testing of upper sands.

Park County

South Park Oil 1 Lamar . . . . . NE NE SE 34-11s-75w
Drilling 7,510 ft. in saturated sand, no water.

Montezuma County

Dunning & Love No. 1 . . . . . NE Lot 3, 4-35n-14w
Drilling 250 ft., first report report, Mancos Divide district.

Rio Blanco County

Texas 4 Unit, NW NW NW 2-2n-94w, Wilson Creek, joint with the California Co., which two weeks ago gave indications of being a dry hole, proved to be a good well and an important extension of the pool. In a 24-hour test it made 442 bbl. through the tubing. It was drilled to 6,698 ft. and had water in the Sundance sand. It was then plugged back to 6,604 ft., set casing on bottom and perforated opposite the Morrison sand at 6,465-6,500 ft. The location is a mile south of the discovery well which also is the nearest producer.

The Buford Oil Co. test on the Yellowjacket-Buford dome begins to look like a discovery. It is drilling at 4,387 ft. in dark gray dolomite with heavier shows of saturation through a hole full of water. It will underream the 6⅝-in. from 4,135 ft. to 4,200 ft. and cement to dry up the hole and test.

John Bockhold 6 Government . . . . SE SE SW 2-1n-102w
Drilling 1,447 ft., Rangely field.
Texas-California 5 Unit . . . . . NW NE NE 34-3n-94w
Location.
Raven O. & R. 31 Government, SW NW NE 32-2n-102w
Drilling 1,200 ft.
Buford Oil 1 Government . . . . . SW SW 16-1n-91w
Drilling 4,387 ft. in dolomite.

WYOMING

Big Horn County

Prescott & Mileski 1 Govt. . . . . NE NW SW 1-51n-93w
S.D. indefinitely at 1,452 ft.
McDonald & Curtis 1 Orchard . . . . . SE NW 24-51n-93w
Resumed at 535 ft., drilling at 820 ft.

Carbon County

Sinclair-Wyoming 3-F Mahoney, deepened to the basal Pennsylvania, is still testing at 4,505 ft. It is now swabbing around 1,000 bbl. a day.

Sinclair-Wyoming 16-A Wertz . . . SW SW SW 6-26n-89w
Drilling 3,478 ft.
Ohio 2 Lundy . . . . . SE NE NW 34-20n-78w
Drilling 1,860 ft.
Sinclair-Wyoming 15-A Wertz . . . SW SW NE 7-26n-89w
Drilling 2,500 ft.

Converse County

U. & I. Oil 1 Beaver . . . . . SE NW 29-35n-68w
Resumed at 1,000 ft., preparatory to cement 10-in. at 920 ft.

Crook County

M. D. Miller 1 Commercial . . . . . SW SE 19-49n-66w
Location, Kara Terrace near Wakefield pool, first report.
Vickers-Continental 1 Duncan-Lobban . . . . . NE NW SW 28-57n-64w
S.D. 1,907 ft., set 10-in. on bottom.

Hot Springs County

Oscar B. Grace 3 Government NW NW NW 21-43n-92w
Drilling 225 ft., 8¼-in. at 43 ft., first report, Kirby Creek district.
J. W. Bales 1 Government . . . . CWL NW SE 21-42n-90w
Drilling 972 ft. after sidetracking tools.

Lincoln County

Superior Oil No. 4-C, NE cor. Lot 3, 3-26n-113w, southern end La Barge field (in Sublette County), was deepened 70 ft. from old total depth of 780 ft. and was recompleted at 850 ft. for 30 bbl. a day.

Woolf Petroleum No. 8, SE cor. Lot 4, 3-26n-113w, old well deepened from 840 ft., was recompleted at 900 ft. for 4 bbl. a day.

Klumpe Synd. 1 . . . . . SE SE SE 4-26n-113w
Drilling 850 ft.

Natrona County

General Pet. 37-22-P . . . . . NW SE SW 22-35n-77w
Rigging up rotary.
Royal Oil Corp. 1 Midert . . . . . SW SW SW 26-35n-80w
T.D. 1,555 ft., underreaming 8-in.
General Petroleum 57-16-S . . . NW SW SE 16-35n-77w
T.D. 4,570 ft., rigging up for pump test.

Niobrara County

Lance Creek had two completions, both inside wells.

Argo 9 Ford, SE SW NE 33-36n-65w, was given a rating of 25 bbl. an hour at 5,550 ft., total depth, from the lower benches of the Leo sand. Top of the Leo was at 5,329 ft.

Continental 20 Tom Bell, NW SE SE 33-36n-65w, which was a disappointment at 5,350 ft., was deepened to 5,490 ft. and completed for 206 bbl. in 24 hours after acidizing with a total of 2,000 gal. Saturated Leo was 5,328-40 ft.

Continental 21 Tom Bell . . . . . NW SW NE 33-36n-65w
T.D. 5,335 ft., testing.
Continental 22 Tom Bell . . . SE NW NW 34-36n-65w
Drilling 2,700 ft., cemented 10¾-in. at 303 ft.
Continental 23 Tom Bell . . . . . SE NW SW 34-36n-65w
Drilling 3,885 ft. in shale.
Ohio 18 Lamb-Acct. 2 . . . . . SE SW NE 5-35n-65w
Drilling 4,125 ft.
Continental 20 Tom Bell . . . . . NW SE SE 33-36n-65w
T.D. 5,490 ft., testing.
Argo 3 Elliott . . . . . C NE NE 6-35n-65w
T.D. 5,316 ft., cemented 5½-in. at 5,313 ft., perf. with 72 holes at 4,954-84 ft., testing.
Ohio 8 Rohlff . . . . . NW SW NE 32-36n-65w
T.D. 5,395 ft., Leo sand at 5,260-5,360 ft., cemented 7-in. at 5,392 ft., preparing to perf. and test.

Park County

Continental 2 Northern Pacific, NE NW NW 23-58n-98w
Drilling 1,241 ft. in shale.
Continental 4 Northern Pacific-1, SE NE SE 23-58n-98w
T.D. 3,150 ft., waiting on pump test.
Resolute 2 State . . . . . SW SW 16-57n-101w
T.D. 10,121 ft., P.B. again to redrill Frontier sands.

Sublette County

North La Barge Oil Co. 5 Government, SE NE NE 28-27n-113w, La Barge field, was completed in the second sand at 1,129 ft., total depth, for 105 bbl. a day. The 8⅝-in. was cemented at 1,070 ft.

North La Barge Oil 6 Government . . . . . CNL SE NE 28-27n-113w
Rigging up cable tools, first report.
Marvel Oil 5 Government . . . . . SE 28-27n-113w
T.D. 1,201 ft., testing in second sand.
Texas 1-I Government . . . . . SW NW SW 27-27n-113w
Drilling 580 ft.

Sweetwater County

Sinclair-Wyoming No. 97-A . . . NW NW SW 11-26n-90w
Location, first report, Lost Soldier field.
Gus Pongratz et al 1 Clark . . . . NW NE 22-19n-104w
S.D. 5,005 ft., moving in heavier equipment, top red beds 4,955 ft.
Red Desert Corp. 1 Aspden . NW SW NW 34-18n-103w
Drilling 5,952 ft. in sand (basal Embar?) which carries sulfur water.
Vermilion Oil 2 Government . . . . SW SW SW 7-12n-99w
T.D. 3,535 ft., reaming to lower 8⅝-in. to bottom.
Sinclair-Wyoming 77-A . . . . . SE NE NE 10-26n-90w
T.D. 4,285 ft., acidized with 1,000 gal., testing.

Uinta County

Spring Valley Pet. No. 13 . . . . CSL SE SE 22-15n-117w
Drilling at 2,210 ft. after P.B. and setting 8⅝-in. at 1,726 ft.
Meridian Oil 2 Pat . . . . . NW NW NE 26-13n-119w
Drilling 1,015 ft., 8¼-in. at 56 ft., first report, Aspen district.

Washakie County

E. W. Sykes 1 Government . . . SE SE NE 23-43n-89w
Location, first report, Mahonany Butte district.

Weston County

Wesco Oil 5 Government . . . . . NE SW SW 29-46n-63w
Spudded, first report.
Riggs Oil 4 State . . . . . CNL NE SE 16-46n-64w
Drilling 2,212 ft., 12½-in. at 271 ft.
Gose Oil Synd No. 1 . . . . . NE NE NE 28-47n-63w
Drilling 5,110 ft.
W. H. Connor 1 State . . . . . NW SW NE 36-42n-61w
T.D. 982 ft., top Sundance 951 ft., 36 ft. oil in hole, will shoot and test.

MONTANA

Big Horn County

Massey Oil & Gas 1 Government SE SW SE 11-2s-31e
Drilling 2,008 ft. in Dakota.

Blaine County

Cherry Ridge Synd. 1 Harbolt . NW NW SW 1-35n-20e
Landed 10-in. at 1,220 ft. for formation shutoff.
Montana Gas 1 Sias . . . . . SE SE SW 4-31n-19e
Resumed, drilling at 1,025 ft.

Cascade County

Bushford Synd. 1 Shannon-Roberts . SW NE 12-20n-1e
Drilling 3,116 ft.

Daniels County

Copan Oil & Gas 2 Wiley . . . . NW NW NW 10-36n-50e
Moving in rotary to resume at 1,928 ft., formerly White Tail Oil & Gas Co.

Fallon County

Montana-Dakota Utilities No. 145, NE SE NE 10-9n-58e, Cedar Creek gas field, was completed at 1,733 ft. for 170,000 cu. ft. of gas a day. The 5½-in. is at 1,482 ft.

Montana-Dakota Utilities 146 Pat, NE SW NE 17-10n-58e
Drilling at 400 ft., 8⅝-in. at 103 ft., first report.

Fergus County

Tony Co. 1 State, CNL NE SW 26-22n-17e, Winifred district, was completed at 440 ft. for 40,000 cu. ft. of gas a day. The 7-in. was set at 407 ft.

Hess & Tony 1 State . . . . . CWL SW NE 36-22n-17e
Spudded, first report.

Garfield County

H. H. Schwartz, Jr., 1 Charles . . . . . SE NW 21-15n-30e
S.D. 3,528 ft. in top Madison, will go to Devonian.

Glacier County

Cut Bank had four completions and five new opera-

tions. There are now 20 operations under way in the field, including the new locations, the purpose being to complete the year's program as far as possible before winter sets in.

Glacier Production 4 Neill, C SW NE 20-33n-5w, swabbed 132 bbl. first 24 hours at 3,012 ft. after plugging back from 3,015 ft. The Cut Bank sand was at 2,955-3,012 ft., with the main pay at 2,998-3,012 ft.

R. C. Tarrant 3 Hope, C NE 18-34n-5w, was completed at 2,730 ft., total depth, as a gas well for 3,000,000 cu. ft. a day. It had 1,000,000 cu. ft. in the Sunburst sand at 2,655-70 ft. and 2,000,000 ft. in the Cut Bank at 2,698-2,726 ft.

A. B. Cobb 1 Tribal-187, C SE NW 19-32n-5w, swabbed 185 bbl. first 24 hours at 2,827 ft., total depth, from the Cut Bank sand at 2,807-20 ft. Main pay was at 2,810-20 ft.

M. R. Wagner 3 Tribal-173, SW SE SE 12-32n-6w, swabbed 246 bbl. first 24 hours at 2,974 ft., total depth, from the Cut Bank at 2,937-73 ft., the main pay being at 2,955-73 ft.

Glacier Prod. Co. 3 Scheuren....CNL NE SW 20-33n-5w
Rigging, first report.
A. B. Cobb 2 Tribal-187..... SE SE NE 19-32n-5w
Rig on ground, first report.
Consolidated Gas 1 Frary-Tribal..NW NW SE 19-32n-5w
Location, first report.
R. C. Tarrant 4 Carmen.....SW SW NE 19-34n-5w
Location, first report.
Texas 9 State.....C NE NE 16-32n-5w
Rigging, first report.
Wm. Hanlon 3 Allotted-131.....SW SE NE 7-32n-5w
Spudded.
Texas 6 Purdy..... NW SW SE 35-35n-6w
Spudded.
British American Oil 13 Tribal ..... C NE SW 34-35n-6w
Drilling 680 ft., top Colorado 520 ft., 10¾-in. at 543 ft.
Kately, Agent 3 Kramer.....NE SE NW 15-34n-6w
Spudded.
Texas 2 Kneale.....C NE NW 14-35n-6w
Spudded.
Texas 9 Morrison..... 660 ft. S of N¼ cor. 27-35n-6w
Drilling in at 2,901 ft., 1,400 ft. oil in hole.
Dakota-Montana 1 Tribal-112 ..SW NW NE 16-35n-6w
T.D. 3,015 ft., plugged back to 2,950 ft. to test Sunburst.
R. A. Kullberg 1 Tribal-182 ..... C NE NW 19-32n-5w
Drilling 1,025 ft., top Colorado 450 ft., 10¾-in. at 478 ft.

Liberty County

Western Natural Gas Co. 3 Townsend, C NW SW 22-37n-4e, inside well in Whitlash field, was completed at 1,416 ft., total depth, for 6,000,000 cu. ft. a day. The 7-in. is at 1,270 ft.

W. E. Drought 1 Thieltgus ..... SE SE SW 21-31n-5e
Resumed at 735 ft., drilling at 1,100 ft.

Stillwater County

Texas 1 Unit ..... SE NW 10-4s-19e
T.D. 7,116 ft., plugged back to 6,690 ft., and set packer at 6,492 ft. for Halliburton test of Frontier.

Toole County

Kevin-Sunburst had two completions and two new operations. Most of the drilling wells in the field were shut down while the drillers and operators observed their annual custom of going deer hunting during the open season. They returned to find a cold wave had settled over the field and few wells resumed.

Big West Oil 4 Ellingson, CWL SW NW 14-35n-3w, which was a failure in the contact at 1,826 ft., total depth, plugged back to 1,610 ft. and completed in the Sunburst sand for 393,000 cu. ft. of gas a day.

Casper T. Olen 11 Engemoen, NW NE SW 11-35n-2w, pumped 25 bbl. of oil and no water a day at 1,634 ft., after acidizing in the contact at 1,629-34 ft. with 1,000 gal.

H. F. Patterson 2 Govt.....SE cor. 15-35n-3w
T.D. 1,727 ft., running 7-in., show oil in Sunburst at 1,535-50 ft., first report.
C. L. Mills 2 Govt.....SE NE SE 8-35n-2w
Drilling 340 ft., first report.
C. E. Biggs 1.....NE NW 22-37n-7e
Rigging up standard rig, Sage Creek district.

NORTHWEST NEW MEXICO

McKinley County

Ambrosia Investors Co., Inc., 1 Govt., SE SE 11-14n-10w
Drilling 1,200 ft.

San Juan County

Red Cactus Oil 1 Tribal.....SE cor. 35-29n-18w
Drilling 850 ft.

San Miguel County

Southwest Drilling, Inc., 1 Conchas, NW NE 34-17n-21e
Recementing 8¼-in. at 2,635 ft.

UTAH

Box Elder County

Northern Oil 1 .....NE SW 17-13n-4w
Resumed at 386 ft. and drilling ahead at 475 ft.

Summit County

Longwell Pet. Co. 1..... SE SW SE 35-3n-5e
Drilling 3,478 ft. in brown limy shale, small show gas with oil colors, 4¾-in. at 3,469 ft. (cor.).

East Texas Fields

(Continued from Page 78)

ft. and drilled out to 4,908 ft., let stand 12 hr. and salt water rose 800 ft. in hole, drilled out to 4,925 ft. and made 85 per cent water and 15 per cent oil, water believed coming from upper part of pay level, still testing, T.D. 4,962 ft.

EAST CENTRAL TEXAS COMPLETIONS

Anderson County

Cayuga field: Stanolind 1 Fitts, water sand from 4,064-89 ft., dry at 4,089 ft.
Wildcat: Hamilton & Smith 1 Hart & Maberry, R. W. Box Survey, 8 mi. SW Elkhart, abandoned location.

Franklin County

Talco field: Humble 2-S Penn-fee, salt-water disposal well at 1,185 ft.

Freestone County

Wortham field: McNeil Pet. 1 Poindexter, 35 bbl. oil and 1,200 bbl. salt water, pumping, 2,970-73 ft.

Kaufman County

Wildcat: W. S. McGee 1 Rutland Savings Bank, John Baker Sur., 2½ mi. NE Tulosa, dry at 3,114 ft.

McLennan County

Wildcat: Rush & Saunders 1 McBride, A. R. Valdez Sur., dry at 820 ft.

Van Zandt County

Wildcat: Graddy 1 Brandon, W. Scott Sur., 5 mi. NE Edgewood, abandoned location.

Permian Basin, Panhandle

(Continued from Page 66)

Upton County

McCamey field: Shell 5 Bowen, new T.D. 2,183 ft., new initial 75 bbl., pumping, old well drilled deeper.

Ward County

Estes field: Gulf 139 Estes, 309 bbl., casing, 500-qt. shot, 3,2500-2,678 ft.
Hutchins field: Gulf 149 Hutchins, 773 bbl., casing, 460-qt. shot, 2,530-2,690 ft.
Texas 6-E University, 1,512 bbl., tubing, 370-qt. shot, 2,602-85 ft.

Winkler County

Keystone field: Standard of Texas 18-63 Baird, 328 bbl., ¾-in. choke, 270-qt. shot, 3,194-3,350 ft.

SOUTHERN WEST TEXAS DRILLING REPORT

Crane County

Gulf 1-F University, SE SE Sec. 22, Blk. 31, University Sur., drilling 8,188 ft.

Culberson County

Cecil Cothrun 1 Casey-Rounsoville, Sec. 7, Blk. 104, P.S.L. Sur., drilling 990 ft.

Ector County

Forest Development Corp. 1 Bradley, SE SE Sec. 18, Blk. 43, Twp. 3s, T.&P. Sur., drilled broken pay 4,350-4,410 ft., balling and testing, cemented back 4,380 ft., oil coming into hole at rate of 1½ bbl. hourly, P.B. 4,362 ft., treated 1,000 gal., swabbed oil and mud.

Hudspeth County

Haymon Krupp 1 Briggs, Sec. 24, Blk. 73, Twp. 7, T.&P. Sur., 5½-in. casing cemented at 6,202 ft., T.D. 6,224 ft., cementing cavings last report.

Loving County

H. C. McAuley 1 E. Hall, SE Sec. 60, Blk. 7, W.&N.W. Sur., T.D. 1,375 ft.

Menard County

Harry Baldwin 1 J. A. Leggett, 760 ft. from W and 900 ft. from S lines, Sec. 1, B.S.&F. Sur., drilling 610 ft.

Pecos County

Culbertson & Irwin 1 R. G. Heiner, NE NE Sec. 589, G.C.&S.F. Sur., Ordovician wildcat, prepare core 1,460 ft.
S. D. Pattillo 1 O'Neil, Sec. 74, Blk. 10, H.&G.N. Sur., Ordovician test, est. 25 to 30 bbl. daily from 1,607-58 ft., testing.
S. D. Pattillo 1 Hoffman, SE NW Sec. 6, Blk. 141, T.&St.L. Sur., 2,000-ft. test, drilling 1,282 ft. (corrected depth).
Cardinal 1-F White & Baker, 440 ft. from N and 3,050 ft. from E lines of Sec. 53, Blk. Z, T.C.R.R. Sur., drilling 1,625 ft.

Presidio County

Wilcox 1 Conring, Sec. 102, Blk. 4, H.&T.C. Sur., running 10¾-in. casing at 1,038 ft., S.D. 1,040 ft.
Wilcox 2 Jones-Coffield, Sec. 38, Blk. 34, H.&T.C. Sur., P.B. to 2,369 ft. from 2,399 ft., preparing to P.B. again, last report.

Reeves County

J. B. Dunnigan 1 A. B. Burchard, SW Sec. 7, Blk. 58, P.S.L. Sur., Delaware test, location.
Roy Johnson 1 Perkins, Sec. 18, Blk. 7-C, P.S.L. Sur., drilling below 1,750 ft. with cable tools.

Sutton County

Domain 1 G. S. Allison, SW NE Sec. 91, Blk. 9, T.W. N.G. Sur., Ellenburger lime test, S.D. 1,098 ft.
S. B. Roberts 1 Allison, NW NE Sec. 44, G.H.&S.A. Sur., drilling 310 ft.

Terrell County

H. H. Sides 1 Rose, Sec. 15, Blk. 148, T.&St.L. Sur., rigging up spudder.

Ward County

Fitzpatrick & Slack 1 Wilson, Sec. 145, Blk. 34, H.& T.C. Sur., 1⅓ mi. SE of discovery well, drilling 3,200 ft.
Gulf 4 Wristen, Sec. 13, Blk. 5, H.&T.C. Sur., scheduled Ordovician test, top Ellenburger 9,022 ft., P.B. to 8,836 ft., old T.D. 9,167 ft., twisted off drill pipe at 8,694 ft. while drilling by junk, set whipstock 8,712-33 ft., T.D. in new hole 8,992 ft., S.D.
Sinclair Prairie 1 Wirt Davis, 330 ft. NW, 2,310 ft. SW lines, Sec. 32, Blk. 4, H.&T.C. Sur., S.D. 3,864 ft., sulfur water.

Winkler County

Gulf 147 O'Brien, SE Sec. 11, Blk. F, G.&M.M.B.&A. Sur., est. 3,000,000 cu. ft. gas 2,677-80 ft., pay from 2,785-88 ft., flowed 75 bbl. daily, still testing.

SOUTHEAST NEW MEXICO

HOBBS, N. M., Nov. 18.—A new oil field was opened in northeastern Eddy County and a new wildcat location was made in the same county to share interest in the Southeast New Mexico district the past week.

The new field was opened by the long-testing Thomas-Bowers 1 H. W. Etz, SW SW NW 13-16-30. Originally drilled to a total depth of 3,744 ft., the hole was plugged back to 3,200 ft. where it flowed 10 bbl. daily on official gage. The discovery is north of the Grayburg-Jackson field and east of the High Lonesome and Root fields. No new development has yet been indicated.

The new wildcat location in Eddy County was the S. P. Yates et al 1 Taylor Ross, SE NW SW 22-19-25, about 10 miles west of Lake McMillan and in the northwestern part of the county.

Activity in general was slightly below normal with only one completion recorded in Lea County and only four in Eddy County. New locations slightly increased from previous weeks, with eight in Lea County and four in Eddy County.

SOUTHEAST NEW MEXICO COMPLETIONS

Eddy County

Wildcat discovery: Thomas-Bowers 1 Etz, SW SW NW 13-16-30, flowed 10 bbl. daily, P.B. 3,200 ft. from 3,744 ft.
Grayburg field: Barnsdall 4-B Dodd, C NW NE 14-17-29, 104 bbl. daily, 24/64-in. choke, 145-qt. shot, 2,497-2,550 ft.
South Maljamar field: Worth Drlg. 2 Taylor, C NW SW 12-18-31, 50 bbl. daily, open tubing, 50-qt. shot, 3,475-3,572 ft.
Wildcat: Tallmadge 1 State, SW SW NE 24-16-28, dry at 2,605 ft.

Lea County

Halfway field: North Shore Oil 1-B State, SW SE NE 16-20-32, dry at 2,728 ft., sulfur water.

SOUTHEAST NEW MEXICO DRILLING REPORT

Chaves County

H. Steinberger 1 Headley.....NW SW 26-14s-29e
Est. 500,000 cu. ft. gas 1,826-28 ft., S.D. 2,245 ft.

Eddy County

Fulton 1 Johnson.....NW SE 22-19-27
Fishing bit in lime 1,435 ft.
Truett & Tallmadge 1 Rudahl .....NE SE 2-20-24
12½-in. 302 ft., drilling 720 ft.
Wills & Abell 1 Hale.....12-20-30
6,000,000 cu. ft. gas from 1,540-60 ft., sulfur water at 1,823-24 ft., P.B. 1,528 ft., perf. casing 1,540-66 ft., est. 100,000 cu. ft. gas, S.D.
Dooley & Haynes 1 Martin.....SE NW 9-18-25
T.D. 1,000 ft., 5½-in. at 975 ft.
Trojan 1 Grant.....SW NE 33-20-25
Set 8¼-in at 1,300 ft., S.D. 1,874 ft.
Clark & LaNeve 1 Boulter.....SE NW 28-19-27
Show oil 1,126 ft., S.D. 1,250 ft.
Suddreth et al 1 Willis.....SW NW 14-20-28
6 mi. W of Getty field, location.
Enmerson Broyles 1 Canfield....SW SW NW 13-18-30
1 mi. NE of Kersey Creek discovery.
Fred Turner 1 DeVito.....12-23-35
Show gas 1,100-05 ft., 7-in. at 1,320 ft., drilling ahead below 1,330 ft.

Lea County

Great Western Prod. 1-D State.....SE SE 30-12-32
T.D. 4,385 ft., P.B. to 3,048 ft., show oil 3,021-33 ft., perf. casing with 24 shots, pumped 40 bbl. oil and 8 bbl. water in 15 hr. and pumped off, still testing.

Otero County

R. H. Ernest 1 Located Land Co.....SE SE 20-25-7
S.D. 3,729 ft.

TEXAS PANHANDLE

AMARILLO, Tex., Nov. 18.—There were a total of seven new oil wells completed in the district the past week, a slight increase over the previous week's figures. Hutchinson County led the district in new locations, receiving four of the eight staked. Two were in Wheeler County and one each in Carson and Gray counties.

PANHANDLE COMPLETIONS

Gray County

Magnolia 37 fee (277), 164 bbl., 340-qt. shot, 2,985-3,078 ft.
Shell 5 McConnell, 112 bbl., pumping, 130-qt. shot, 3,110-60 ft.
Texas 6 Webb, 160 bbl., pumping, 130-qt. shot, 3,235-3,300 ft.
Tripplehorn 6 Webb, 19 bbl., pumping, 2,700-45 ft.
Warner Oil 3 Morse, 101 bbl., naturally, pumping 2,782-93 ft.

Hutchinson County

Kewanee Oil 48 Lewis, 350 bbl., pumping, 420-qt. shot, 2,880-3,002 ft.
Phillips 10 Jordan, 142 bbl., pumping, 200-qt. shot, 2,925-40 ft.

DRILLING REPORT

Hansford County

I. T. I. O. 1 O'Laughlin, SE SE Sec. 2, Blk. 2, W.C.R.R. Sur., 3,000-ft. test, drilling 2,960 ft.

Motley County

Humble 1 Matador, Sec. 29, Blk. J, B.S.B.&C.N.G. Sur., fishing bit 5,400 ft.

Ochiltree County

James R. Macon 1 W. R. Norris, SW SE Sec. 212, Blk. 43, H.&T.C. Sur., T.D. 6,274 ft., P.B. 4,300 ft., S.D.O., prepare P.B. to 4,000 ft. and shut off water.

Swisher County

Krupp-Flaherty 1 Keen, Sec. 120, Blk. 10-M, 6,500-ft. test, top salt 1,020 ft., S.D., casing 1,747 ft.

One Mile North Extension In Turner Valley Field

By VICTOR LAURISTON

CHATHAM, Ont., Nov. 18.—Preliminary figures of crude production from the limestone in Turner Valley shows a total of 767,500 bbl. for October, compared with 787,083 bbl. in September. These figures do not include shallow crude or naphtha and natural gasoline.

Turner Valley Completions

North Turner Valley: Alberta Oil Incomes 2, LSD 4, 4-21-3w5, finished at 8,809 ft., produced 98 bbl. in the first hour on 1-in. choke test. Previously a 24-hour run gave 529 bbl., increasing to 850 bbl. the second day with 1,474-lb. pressure on the casing and 380 lb. on the tubing. Allowable will likely be close to 1,000 bbl. a day. This completion extends the proven field a mile north of Home Oil 2, previously the most northerly producer.

Foothills Oil & Gas 5, LSD 13, 27-20-3w5, got the black lime at 7,755 ft. Tubing has been run and acidizing and testing is in progress.

West Central field: Okalta Oil 9, LSD 13, 18-19-2w5, finished at 7,971 ft., has been reacidized with 10,000 gal., developing a flow of 25 bbl. an hour. Calmont-Northwest 2, LSD 5, finished at 7,956 ft., is testing, and looks like a major producer, probably close to 1,000 bbl.

Arrow Royalties 2, LSD 15, 13-19-3w5, finished at 8,353 ft., flowed by heads 475 bbl. a day and is continuing acid treatments. Twin Valley Syndicate 1, LSD 9, finished at 8,184 ft., flowed by heads 296 bbl. a day, and has gun-perforated the lime to increase production.

Southwest field: Northwest-Hudson's Bay 4, LSD 14, 8-18-2w5, finished at 8,387 ft. is acidizing and testing with indications of a small producer, around 200 bbl. a day.

Tests in the Lime

North Turner Valley: Home Oil 1, LSD 8, 33-20-3w5, is below 7,332 ft., more than 130 ft. in the lime.

Home Oil 5, LSD 16, 28-20-3w5, is below 7,855 ft. and nearing completion.

West Central field: Allied Royalties 1, LSD 16, 6-19-2w5, is below 7,490 ft., after getting the Madison at 7,169 ft.

Vermilion Field

In the Vermilion field, east-central Alberta, Acme Oil & Gas 1, LSD 5, 20-50-5w4, has deepened to 1,834 ft. and is testing. A gas flow, estimated around 7,000,000 cu. ft., encountered at 1,820 ft., blew down rapidly, but was accompanied by some crude. Vermilalta-Frankview 2, LSD 4, 29-50-5w4, finished at 1,830 ft., has been cleaned out and is flowing around 55 bbl. a day of crude between 13 and 14 gravity.

Saskatchewan Gas Strike

Possibilities of a northerly extension into Saskatchewan of the Bowdoin gas field in Montana are indicated by the gas strike in the Natural Sodium Products Co. well near Bishopric. The test, drilled primarily for crude for the company's oil refinery at Lake Johnstone, encountered gas, estimated 15,000,000 cu. ft. a day with 1,000-lb. pressure, around 1,500-ft. depth. Location is close to the Montana boundary, about 15 miles south of Val Marie, and about 230 miles southwest of Regina. Potential markets for the field are the sulfate and oil plants in the Bishopric area, and the southern Saskatchewan cities of Regina, Moose Jaw and Swift Current.

Warwick Shallow Field

In the Warwick field in Lambton County, Ontario, drilling for shallow oil is still being carried on, with five outfits active in various parts of the field. In Metcalfe Township, Middlesex County, in the east end of the field, a test by a Detroit syndicate on the Mrs. W. Freer farm developed 75 to 100 bbl. a day flush with heavy gas pressure. Two more wells are being drilled on this property. Alton Woods and Robert Davison of Strathroy and Howard Litt of Kerwood are drilling on the G. A. Westgate farm on No. 22 Highway close to the Adelaide-Warwick Township line. W. B. Dark has the contract and the test is near the producing horizon. Farther west, in Warwick Township, Wilson & Sullivan of Sarnia are drilling a deep test on the Brown farm. Tentative arrangements have been made for a natural-gas franchise for Strathroy should the test secure commercial production.

Tar Sand Operations

In the McMurray district of northern Alberta, continuous test operations are being started at the recently enlarged plant of Abasand Oils. During the past summer intermittent operations have been carried on, the output on a test basis ranging from gasoline to road oil. The plant is designed for a daily output of 350 bbl. of oil, the equipment including mining machinery, separation plant and refinery. Products include gasoline, naphtha, diesel oil, heavy fuel oil, road oils, asphalts and coke. A 2-mile pipe line will be laid to Waterways, connecting with both the end of steel and inland navigation.

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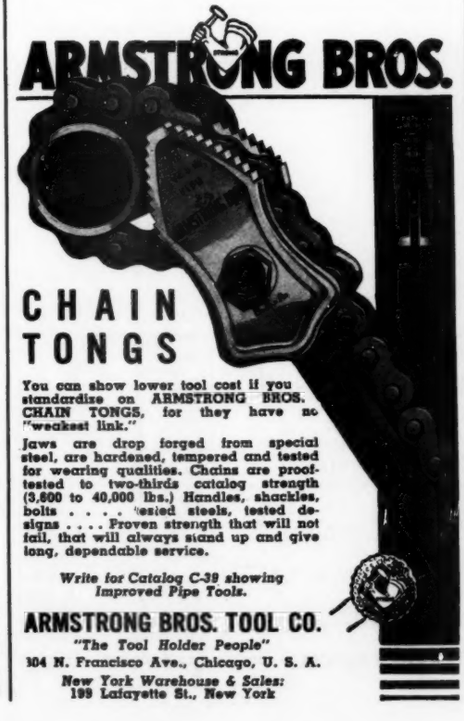

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LOUISIANA GULF COAST

Oil Discovered in New Sand in La Pice Distillate Pool

By F. L. SINGLETON

NEW ORLEANS, La., Nov. 18.—A new sand discovery in the La Pice field, St. James Parish, converted this gas-distillate structure into an oil field by the completion of Shell 1 Federal Land Bank which flowed 288 bbl. of 38.5-gravity oil per day through various chokes. The well was gaged later through a 8/64-in. choke and flowed 189 bbl. per day. Tubing pressure was 1,475 lb. and casing pressure 2,400 lb. Drilled to a total depth of 10,900 ft., production was obtained by perforating casing at 7,646-52 ft. Location is in 38-12s-15e, about ½ mile northwest of the discovery well which was completed in 1938 as a distillate producer through perforated casing at 10,910-15 ft. This is the third producer for the field, the other producer having been completed as a distillate well through perforated casing at 11,340-55 ft.

New Sand in Lake Salvador

Texas 2 State, the second well to be drilled in the Lake Salvador field, St. Charles Parish, opened production from a new sand as it flowed 454 bbl. per day through a $\frac{1}{4}$-in. choke from perforated casing at 10,018-29 ft. Tubing pressure was 1,750 lb. Gravity of the oil tested 32.7. The well is situated in 26-16s-22e, about 1,200 ft. south of the discovery well which was completed through perforated casing at 9,775-9,800 ft. Several sands are known to have been logged in the discovery well, and these will no doubt be tested as development continues.

West of New Orleans in the Westwego area, Jefferson Parish, Titanic Oil Co. is attempting to cut and pull stuck drill stem in 1 Marrero Land & Improvement Co. which the previous week blew out while drilling at 9,935 ft., the total depth. The well was opened through a 2-in. flow line which was connected with the blowout preventer, and it flowed gas, distillate, and some oil. The sand section was topped at 9,796 ft., and several showings of oil and gas were logged at intervals to the present depth.

Iowa Deep Pay Extended

In the Iowa field, Calcasieu-Jefferson Davis Parish, Magnolia was perforating casing in 15 Wait which is expected to extend production of the deep pay several hundred feet north. The hole is bottomed at 8,235 ft. and 7-in. casing was cemented at 8,234 ft. The lower Frio sand was topped at 8,163 ft., and the gas-oil contact was established at 8,190 ft. Attention in the field was centered on Shell 32 Heyd, which is bottomed at 9,154 ft., and sidewall cores were being cut in a new sand section logged by an electrical survey at 8,723-8,822 ft. On the north side of the field, Glassell & Glassell 1 Bowman is drilling in shale with no shows of oil or gas below 8,945 ft.

On the South Lake Charles field, Calcasieu Parish, W. T. Burton and Continental 1 Mayo Realty Co., a prospective pool opener, has recovered 1,100 ft. of stuck drill pipe, and the well is expected to be tested within the next few days. The drill pipe was stuck when the well blew out from a depth of 10,939 ft.

In the Neale field, Beauregard Parish, Atlantic 1-C Rice Land & Lumber Co., 1½ miles west of production, is scheduled to be tested the first of the week. The well is bottomed at 8,420 ft., and casing was cemented for completion after saturation in the Wilcox sand was cored at 8,346-63 ft. The company's 3 Musser-Davis flowed 253 bbl. daily through a $\frac{1}{4}$-in. choke from sand at 8,360-70 ft.

North Crowley Field

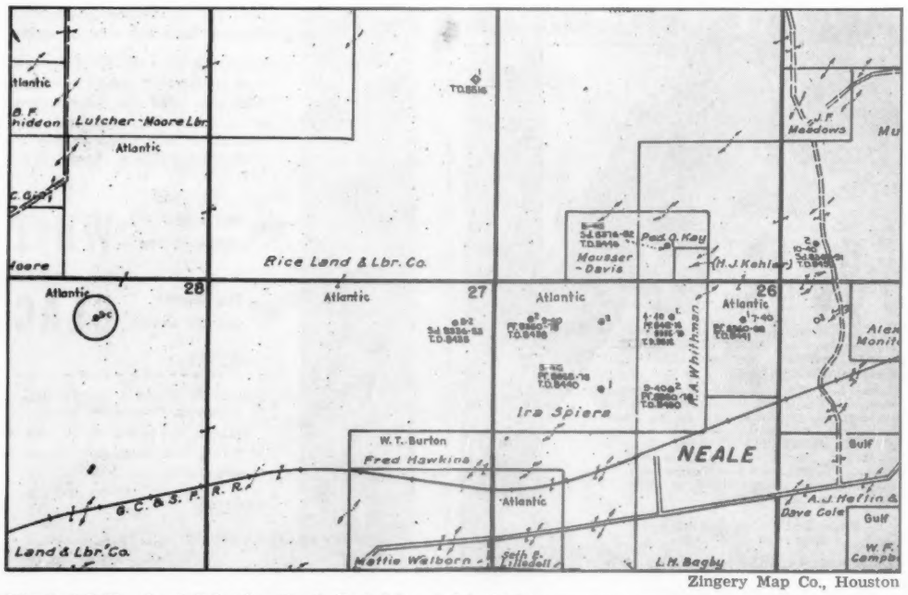
A slight north extension to the North Crowley field, Acadia Parish, was recorded as Humble completed 1 Reiners for an initial production of 792 bbl. daily through a ¼-in. choke. The well was drilled to a total depth of 8,810 ft., with the completion through perforated casing. Location is in 46-8s-1e, east of Vincent & Welch 1 Lutcher Harmon.

In the West Mermentau area, Acadia Parish, H. M. Naylor is preparing to spud 1 J. G. Medinka estate, located east of the Mermentau River, and about 1½ miles north of the operator's 1 Acadia Development Co., the discovery well.

In the South Roanoke field, Jefferson Davis Parish, Continental 3 Calcasieu National Bank is bottomed at 10,638 ft. and a short string of 5-in. casing was cemented at 10,597 ft., preparatory to testing. This well was recently completed as a distillate producer in the regular pay at 9,935-60 ft., but was killed and drilled deeper in search of a new pay. Details of the core record below 9,900 ft. were not available.

Superior 1 Stuart, a deep test located on the northwest flank of the Section 28 salt dome, St. Martin Parish, is bottomed at 9,675 ft., and sidewall cores are being cut at 9,530-40 ft. Seven-inch protection string was recently cemented in this well after an electrical survey and sidewall cores showed favorable sand sections at intervals from 8,648-9,148 ft.

In Terrebonne Parish and located on the old Bay Junop salt dome, Stanolind 1 State is bottomed at 8,380 ft., and 7-in. casing was cemented on bottom following an electrical survey. It was not disclosed whether the casing was cemented for a production test or as a protection against heaving shale.



Zingery Map Co., Houston

Atlantic 3-C Rice Land & Lumber Co. (indicated by circle) which is expected to mark up an important extension of the Wilcox pay in the Neale field, Beauregard Parish

LOUISIANA GULF COAST COMPLETIONS

Avoyelles Parish

Wildcat: Snowden & Co. 1 Snowden, dry, T.D. 7,210 ft.
Eola field: Gulf 1 Mouliere, dry, T.D. 8,612 ft.

Calcasieu Parish

Sulphur field: Union Sulphur 872 fee, 176 bbl., ¼-in. choke, perf. casing 5,690-98 ft., T.D. 5,889 ft.

Cameron Parish

Cameron Meadows field: Magnolia 20 Cameron Meadows, dry, T.D. 6,311 ft.
Chalkley field: Humble 5 School Board, dry, T.D. 9,214 ft.
East Hackberry field: Gulf 27-A Irwin, dry, T.D. 7,354 ft. Harrison & Abercrombie 1 Doiron, dry, T.D. 6,225 ft.

East Baton Rouge Parish

University field: William Helis 10 Neison, 245 bbl. 10/64-in. choke, perf. casing 6,757-64 ft., T.D. 7,170 ft.

Evangeline Parish

Ville Platte field: Danciger 1 Oscar Pitre, 245 bbl., $\frac{1}{8}$-in. choke, perf. casing 10,182-92 ft., T.D. 10,233 ft. J. K. Hughes 2 Ortego, 435 bbl., $\frac{1}{8}$-in. choke, perf. casing 10,160-90 ft., T.D. 10,255 ft.
Wildcat: W. B. Hamilton 1 Amy, dry, T.D. 8,025 ft.

Iberia Parish

Fausse Point field: Sun 3 Planters Lumber Co., dry, T.D. 1,408 ft.

Plaquemines Parish

Stella field: California Co. 17 Delta Minerals Co., 265 bbl., ⅛-in. choke, perf. casing 9,980-85 ft., T.D. 10,003 ft.
Grand Bay field: Gulf 8-A Grand Prairie Levee Dist., 389 bbl., 5/32-in. choke, perf. casing 9,987-95 ft., T.D. 10,004 ft.
Quarantine Bay field: Gulf 1-A Orleans Levee Board, dry, T.D. 8,186 ft.

St. Martin Parish

Anse La Butte field: Iberia Petroleum Co. 3-A Moresi, 135 bbl., 10/64-in. choke, perf. casing 2,360-75 ft., T.D. 2,955 ft.

Terrebonne Parish

Bay St. Elaine field: Texas 5-B State, 320 bbl., ⅛-in. choke, T.D. 7,867 ft.

Vermilion Parish

Gueydan field: Fohs 1 Mulvey Irrigation Co., 23 bbl. distillate, 10/64-in. choke, perf. casing 9,248-54 ft., T.D. 9,961 ft.

LOUISIANA GULF COAST DRILLING REPORT

Acadia Parish

Herton 1-A Leonard, 29-7s-1e, drilling shale 7,365 ft.

Assumption Parish

Humble 1 Michle, 108-14s-15e, drilling shale 9,174 ft.

Cameron Parish

Danciger Oil & Refining Co. 1 Mallett Bay Land Co., east of Grand Lake field, 23-13s-3w, drilling sandy shale 8,500 ft.

St. Martin Parish

Texas 9 State, Lake Mongoulois field, drilling shale and sand 8,970 ft.

St. Mary Parish

E. G. Bateman et al 1 W. P. Foster, South Franklin prospect, 38-15s-9e, T.D. 10,500 ft., 5½-in. casing 10,481 ft., testing.
Texas 1 State-Rabbitt Island, drilling shale 7,045 ft.

Vermilion Parish

Union Oil Co. 4 Louisiana Land & Fur Co., Schooner Bayou field, T.D. 9,025 ft., drill stem stuck, fishing.
Union Oil Co. 1-B School Board, Schooner Bayou field, drilling shale and lime 8,576 ft.

Kansas Fields

(Continued from Page 68)

Rice County

Cities Service Gas 1 Hilt . . . . . C SE 15-19-8w
Viola 3,272 ft., Simpson 3,287 ft., Arbuckle lime 3,317-25 ft., received puff gas and 2,500 ft. water, P.B. 3,307 ft.
R. E. Hess et al 1 Cole . . . . . SE SE NE 31-20-6w
Topeka 2,375 ft., drilling 2,530 ft.

Rooks County

Palmer Oil 1 Denio . . . . . C E½ SW NE 17-8-16w
Drilling 2,820 ft.

Russell County

Pryor & Lockhart 1 Borrell . . C N½ NE SE 3-15-11w
Drilling 1,785 ft.
Braden & McClure 1 Phillip . C N½ NW SE 34-15-11w
Set 8-in. casing 2,400 ft., drilling 2,435 ft.

Stafford County

Bradley Bros. 1-A Davis . . . C W½ SW SW 32-23-12w
Show oil 3,850-65 ft., Simpson 3,905 ft., Arbuckle lime 3,972 ft., T.D. 3,978 ft., P.B. 3,865 ft.

Sumner County

E. B. Shawver et al 1 Knowlton C W½ NW SE 6-33-2
Drilling 2,788 ft.

Thomas County

Alva Billings 1-A Ryan . . . . . C E½ NE SE 27-8-32w
Drilling 1,300 ft.

Summary of Operations, All Fields for October

SUMMARY OF ALL FIELDS

Wells Completed

Field—	Comp.	Prod.	Dry	Gas
Appalachian	405	435	25	84
Ohio	145	64	38	74
Kentucky	48	1,440	10	5
Michigan	137	9,912	66	14
Illinois	352	49,972	82	2
Indiana	68	5,306	23	13
Kansas	174	52,139	34	2
Oklahoma	190	31,066	59	22
Missouri	4	0	3	1
Nebraska	17	4,725	8	0
N. Cent. Texas	289	73,292	102	3
West Texas	156	119,969	11	3
Texas Panhandle	55	9,962	5	7
East Texas	65	5,220	10	4
E. Texas Border	10	590	5	2
Gulf Coast Texas	103	22,756	21	4
Lower Gulf Coast Texas	62	6,129	15	3
S. Cent. Texas	23	753	7	2
South Texas	92	5,185	35	1
S.E. New Mexico	50	10,851	9	2
Arkansas	15	2,630	5	1
North Louisiana	68	4,950	14	8
Gulf Coast La.	85	17,721	22	0
Mississippi	10	1,740	5	0
Alabama	4	0	4	0
Georgia	0	0	0	0
Florida	0	0	0	0
Montana	23	1,440	5	5
Utah	0	0	0	0
Wyoming	18	5,130	7	1
Colorado	2	212	0	0
N.W. New Mexico	4	97	1	1
Total Oct.	2,674	443,686	631	264
Total Sept.	2,225	369,071	531	190
Difference	443	74,615	100	54

Rigs and Wells Drilling

Field—	Rigs	Drlg.	Ttl.
Appalachian	48	473	521
Ohio	46	183	229
Kentucky	7	87	94
Michigan	34	135	169
Illinois	80	309	389
Indiana	10	76	86
Kansas	26	215	241
Oklahoma	38	281	319
Missouri	1	7	8
Nebraska	6	25	31
Iowa	0	2	2
North Central Texas	127	255	382
West Texas	126	249	375
Texas Panhandle	18	71	89
East Texas	25	60	85
East Texas Border	0	10	10
Gulf Coast Texas	35	96	131
Lower Gulf Coast Texas	10	60	70
South Central Texas	4	36	40
South Texas	11	47	58
Southeast New Mexico	19	82	101
Arkansas	3	31	34
North Louisiana	10	81	91
Gulf Coast Louisiana	14	132	146
Mississippi	2	33	35
Alabama	0	6	6
Georgia	0	2	2
Florida	0	1	1
Montana	2	78	80
Utah	2	5	7
Wyoming	9	68	77
Colorado	0	35	35
Northwest New Mexico	1	11	12
Total Oct.	714	3,242	3,956
Total Sept.	602	3,021	3,623
Difference	112	221	333

APPALACHIAN FIELDS

Field—	Comp.	Prod.	Dry	Gas	Rgs.	Dlg.
Bradford	*201	217	0	0	9	178
Allegany	*47	54	1	0	3	30
N. Oriskany	7	0	2	5	3	19
Middle dist.	36	19	1	1	1	12
Butler-Armstrong	5	21	0	3	3	6
SW. Penn.	36	47	7	25	7	61
W. Virginia	73	77	14	50	22	167
Ttl. Oct.	405	435	25	84	48	473
Ttl. Sept.	395	432	18	62	62	462
Difference	10	3	7	22	14	9

*Includes water-intake wells.

OHIO

	Comp.	Prod.	Dry	Gas	Rgs	Drg.
Allen	0	0	0	0	0	1
Ashland	0	0	0	0	1	5
Ashtabula	0	0	0	0	0	1
Athens	17	2	7	9	6	18
Belmont	0	0	0	0	0	1
Coshocton	2	40	1	0	1	3
Cuyahoga	3	0	0	3	1	6
Fairfield	3	0	1	2	1	2
Gallia	2	0	1	1	0	2
Geauga	0	0	0	0	0	2
Guernsey	4	0	1	3	1	6
Harrison	0	0	0	0	0	1
Henry	0	0	0	0	0	1
Hocking	0	0	0	0	0	1
Holmes	3	0	1	2	2	7
Jackson	1	0	0	1	0	0
Jefferson	1	1	0	0	0	0
Knox	2	0	0	2	6	7
Lawrence	1	0	0	1	2	4
Licking	18	80	3	11	6	23
Lorain	4	0	1	3	3	4
Medina	17	48	4	3	2	6
Meigs	5	0	1	4	0	7
Monroe	9	6	3	4	1	8
Morgan	4	0	2	2	0	4
Muskingum	4	49	1	2	2	10
Noble	10	8	2	5	2	11
Perry	10	227	1	1	2	8
Richland	1	0	0	1	0	0
Seneca	1	0	1	0	0	0
Stark	2	0	0	2	0	6
Summit	1	0	0	1	1	2
Tuscarawas	4	0	1	3	0	12
Vinton	0	0	0	0	0	1
Washington	15	3	5	8	5	12
Wayne	1	0	1	0	1	1
Ttl. Oct.	145	464	38	74	46	183
Ttl. Sept.	95	304	33	40	47	177
Difference	50	170	5	34	1	6

EASTERN KENTUCKY

	Comp.	Prod.	Dry	Gas	Rgs	Drg.
Floyd	2	0	0	2	0	5
Knott	2	0	0	2	0	6
Pike	0	0	0	0	1	1
Martin	0	0	0	0	0	2
Johnson	0	0	0	0	0	1
Magoffin	0	0	0	0	0	3
Estill	0	0	0	0	1	1
Lee	10	57	1	0	2	4
Morgan	0	0	0	0	2	1
Greenup	1	5	0	0	0	1
Carter	0	0	0	0	0	1
Breathitt	0	0	0	0	0	1
Ttl. Oct.	15	62	1	4	6	26
Ttl. Sept.	8	6	1	5	5	31
Difference	7	56	0	1	1	5

*Gas production from above wells—combined, 5,472,000 cu. ft.

WESTERN KENTUCKY

	Comp.	Prod.	Dry	Gas	Rgs	Drg.
Breckinridge	0	0	0	0	0	1
Butler	2	10	1	0	0	1
Christian	0	0	0	0	0	2
Daviess	10	829	1	0	0	19
Grayson	0	0	0	0	0	2
Hancock	3	32	1	0	0	4
Henderson	3	100	2	0	0	4
Hopkins	0	0	0	0	0	2
Larue	0	0	0	0	0	1
Logan	1	0	1	0	0	0
McLean	3	50	1	0	1	6
Muhlenberg	0	0	0	0	0	1
Ohio	9	107	2	0	0	15
Webster	2	250	0	1	0	3
Ttl. Oct.	33	1,378	9	1	1	61
Ttl. Sept.	50	2,796	21	0	0	58
Difference	17	1,418	12	1	1	3

MICHIGAN

	Comp.	Prod.	Dry	Gas	Rgs	Drg.
Allegan	56	4,566	23	0	8	23
Arenac	9	2,792	2	1	2	7
Barry	1	0	1	0	1	1
Bay	1	130	0	0	0	1
Berrien	1	0	1	0	0	1
Calhoun	0	0	0	0	0	1
Cass	2	3	1	0	1	4
Clare	8	100	4	3	0	6
Gladwin	1	15	0	0	2	5
Gratiot	1	0	0	1	3	1
Huron	0	0	0	0	2	8
Ingham	0	0	0	0	0	2
Isabella	6	697	1	2	1	7
Kalamazoo	0	0	0	0	0	1
Kent	4	70	3	0	3	7
Lenawee	0	0	0	0	0	2
Mackinac	0	0	0	0	0	1
Manistee	1	0	1	0	0	1
Mason	0	0	0	0	1	0
Mecosta	0	0	0	0	0	1
Midland	1	300	0	0	0	2
Missaukee	0	0	0	0	0	1
Monroe	5	0	5	0	0	8
Montcalm	6	0	3	3	2	6
Muskegon	0	0	0	0	0	3
Oakland	1	0	1	0	0	1
Ogemaw	0	0	0	0	0	3
Osceola	4	0	0	4	0	3
Otsego	0	0	0	0	0	2
Ottawa	12	371	5	0	4	10
Roscommon	2	0	2	0	0	0
Saginaw	0	0	0	0	1	0
St. Clair	3	0	3	0	0	1
Shiawassee	0	0	0	0	0	2
Tuscola	0	0	0	0	0	2
Van Buren	12	868	10	0	1	9
Wayne	0	0	0	0	0	1
Ttl. Oct.	137	9,912	66	14	34	135
Ttl. Sept.	84	9,302	39	8	28	135
Difference	53	610	27	6	6	0

*Gas production in million cubic feet: Arenac, 1.562; Clare, 25.235; Gratiot, 0.824; Isabella, 1.106; Montcalm, 4.0; Osceola, 56.48.

ILLINOIS

	Comp.	Prod.	Dry	Gas	Rgs	Drg.
Adams	0	0	0	0	0	1
Bond	9	203	3	0	0	9
Bureau	1	0	1	0	0	1
Clark	1	0	1	0	0	6
Clay	9	2,313	0	0	0	3
Clinton	22	551	10	0	2	9
Coles	0	0	0	0	0	1
Crawford	2	0	2	0	0	1
De Kalb	0	0	0	0	0	1
Douglas	1	0	1	0	1	0
Edgar	4	0	4	0	0	0
Edwards	13	9,038	1	0	10	8
Effingham	2	112	0	0	0	2
Fayette	46	3,747	9	0	6	28
Ford	0	0	0	0	0	1
Franklin	8	2,456	1	0	2	7
Gallatin	3	200	2	0	2	4
Greene	0	0	0	0	0	1
Hamilton	12	1,385	3	0	3	23
Hancock	1	0	1	0	0	1
Henderson	1	0	1	0	0	0
Jackson	0	0	0	0	0	2
Jasper	10	4,620	2	0	4	11
Jefferson	1	56	0	0	0	6
Jersey	0	0	0	0	0	1
Lawrence	3	0	3	0	0	4
McDonough	1	0	1	0	0	0
Macoupin	1	0	1	0	0	2
Madison	1	0	1	0	0	2
Marion	56	7,629	4	0	3	12
Massac	1	0	1	0	0	0
Montgomery	5	0	3	2	0	10
Perry	0	0	0	0	0	2
Peoria	0	0	0	0	0	2
Randolph	1	0	1	0	1	4
Richland	8	1,493	1	0	2	10
St. Clair	4	504	0	0	0	2
Saline	1	0	1	0	0	2
Schuyler	1	0	1	0	0	0
Shelby	0	0	0	0	1	2
Tazewell	0	0	0	0	0	1
Wabash	20	2,011	8	0	3	16
Warren	0	0	0	0	0	1
Washington	6	86	3	0	1	6
Wayne	32	7,383	3	0	8	22
White	64	6,185	7	0	21	82
Woodford	1	0	1	0	0	0
Ttl. Oct.	352	49,972	82	2	70	309
Ttl. Sept.	334	59,967	81	1	50	224
Difference	18	9,995	1	1	20	85

INDIANA

	Comp.	Prod.	Dry	Gas	Rgs	Dlg.
Adams	0	0	0	0	0	1
Benton	0	0	0	0	0	1
Blackford	1	0	0	1	0	0
Daviess	1	0	1	0	0	4
Dearborn	0	0	0	0	0	1
Decatur	3	0	0	3	0	1
Delaware	1	0	1	0	0	0
Duobis	0	0	0	0	0	1
Floyd	1	0	1	0	0	0
Gibson	22	3,235	5	0	4	15
Greene	0	0	0	0	0	3
Hamilton	0	0	0	0	0	2
Hancock	2	0	1	1	0	1
Harrison	1	0	0	1	0	0
Henry	1	0	0	1	0	1
Jackson	0	0	0	0	1	0
Jay	1	1	0	0	1	3
Jasper	0	0	0	0	0	2
Knox	2	492	1	0	0	4
Lake	0	0	0	0	0	1
Madison	1	0	1	0	0	0
Martin	0	0	0	0	0	1
Newton	0	0	0	0	1	1
Pike	1	0	1	0	0	2
Porter	2	0	2	0	0	2
Posey	12	1,525	1	2	2	13
Randolph	4	0	2	2	0	3
Shelby	0	0	0	0	0	1
Spencer	8	40	4	2	0	7
St. Joseph	1	0	1	0	0	0
Steuben	0	0	0	0	1	0
Sullivan	0	0	0	0	0	1
Vanderburg	2	13	0	0	0	2
Vigo	1	0	1	0	0	1
Warrick	0	0	0	0	0	1
Ttl. Oct.	68	5,306	23	13	10	76
Ttl. Sept.	48	4,962	14	6	28	72
Difference	20	344	9	7	18	4

*Gas production in million cubic feet: Blackford, 0.03; Decatur, 0.423; Hancock, 0.002; Harrison, 0.2; Henry, 0.005; Posey, 1.15; Randolph, 1.3; Spencer, 1.445.

KANSAS

	Comp.	Prod.	Dry	Gas	Rgs	Dlg.
Barber	2	0	2	0	0	2
Barton	23	5,298	1	0	3	25
Brown	0	0	0	0	0	1
Butler	9	1,631	2	0	3	13
Cowley	9	2,630	4	0	2	9
Douglas	0	0	0	0	0	2
Doniphan	0	0	0	0	1	0
Ellis	12	5,333	3	0	1	20
Ellsworth	19	5,578	0	0	3	15
Grant	0	0	0	0	0	3
Greenwood	17	163	9	0	1	18
Jefferson	2	0	1	1	0	1
Johnson	1	0	1	0	0	2
Kearny	1	0	1	0	0	0
Kingman	1	237	0	0	0	1
Leavenworth	1	0	0	1	0	1
McPherson	13	7,521	0	0	2	17
Marion	4	280	1	0	1	3
Nemaha	0	0	0	0	0	1
Phillips	0	0	0	0	0	1
Pratt	2	418	0	0	0	6
Reno	3	560	1	0	0	1
Rice	11	3,031	1	0	1	16
Rooks	7	3,164	1	0	0	7
Russell	21	12,801	1	0	4	28
Sedgwick	2	0	2	0	0	0
Stafford	13	3,479	3	0	4	18
Stevens	0	0	0	0	0	1
Trego	0	0	0	0	0	1
Woodson	1	15	0	0	0	2
Ttl. Oct.	174	52,139	34	2	26	215
Ttl. Sept.	129	36,567	31	5	32	216
Difference	45	15,572	3	3	6	1

OKLAHOMA

	Comp.	Prod.	Dry	Gas	Rgs	Drg.
Atoka	0	0	0	0	0	1
Beckham	1	0	1	0	0	1
Caddo	6	3,372	0	1	0	12
Carter	17	2,439	3	1	3	22
Coal	1	0	1	0	0	0
Comanche	3	0	2	1	0	5
Cotton	0	0	0	0	0	2
Creek	13	141	5	3	2	14
Cleveland	0	0	0	0	0	1
Garvin	1	0	1	0	0	0
Grady	5	46	0	2	1	3
Hughes	3	239	1	0	1	2
Jackson	3	285	1	0	1	8
Jefferson	2	0	2	0	0	1
Johnston	0	0	0	0	0	1
Kay	6	69	4	0	0	4
Kiowa	1	0	1	0	0	5
LeFlore	1	0	1	0	0	0
Lincoln	8	336	3	2	2	7
Logan	1	200	0	0	0	3
Love	0	0	0	0	0	1
Marshall-Bryan	2	3,672	0	0	2	11
Noble	2	3,523	0	0	0	2
McIntosh	1	0	1	0	0	1
Okfuskee	15	9,656	2	2	3	22
Oklahoma	3	2,083	0	0	1	15
Okmulgee	20	115	7	1	3	12
Osage	13	1,948	2	1	3	12
Pawnee	0	0	0	0	0	7
Payne	5	690	1	1	1	4
Pontotoc	8	866	3	1	2	15
Pottawatomie	5	501	2	0	3	13
Seminole	11	481	2	0	2	13
Stephens	8	136	4	1	0	15
Texas	3	0	1	2	0	0
Tillman	3	66	2	0	1	6
Tulsa	9	32	1	3	1	9
Wagoner	10	170	5	0	1	8
Woods	0	0	0	0	0	1
Miscellaneous	0	0	0	0	5	22
Ttl. Oct.	190	31,066	59	22	38	281
Ttl. Sept.	126	10,269	43	13	43	233
Difference	64	20,797	16	9	5	48

WEST CENTRAL AND NORTH TEXAS

	Comp.	Prod.	Dry	Gas	Rgs	Drg.
Archer	42	20,326	11	0	26	29
Bell	0	0	0	0	0	2
Brown	4	23	2	0	2	6
Baylor	0	0	0	0	2	2
Callahan	3	0	3	0	2	7
Clay	23	740	13	0	13	14
Coleman	6	552	1	0	2	9
Comanche	2	0	2	0	0	2
Cooke	24	4,394	4	0	8	12
Denton	1	0	1	0	0	2
Erath	2	15	1	0	0	1
Eastland	5	797	4	0	3	4
Fisher	0	0	0	0	0	2
Foard	0	0	0	0	0	2
Grayson	0	0	0	0	0	1
Hamilton	0	0	0	0	0	4
Hardeman	1	0	1	0	0	0
Haskell	0	0	0	0	0	1
Hood	0	0	0	0	0	1
Jack	9	742	4	0	3	14
Jones	11	1,251	6	0	5	13
Montague	5	4,416	3	0	6	16
Palo Pinto	0	0	0	0	1	6
Parker	1	0	1	0	0	3
Runnels	2	360	1	0	0	3
San Saba	0	0	0	0	0	1
Shackelford	20	184	10	2	3	10
Stephens	2	135	0	0	0	3
Tarrant	0	0	0	0	1	1
Taylor	1	361	0	0	0	4
Throckmorton	0	0	0	0	0	1
Wichita	62	25,537	10	0	28	39
Wilbarger	11	4,675	1	0	6	11
Wise	0	0	0	0	1	1
Young	52	8,784	23	1	15	28
Ttl. Oct.	289	73,292	102	3	127	255
Ttl. Sept.	187	53,827	65	3	108	250
Difference	102	19,465	37	0	19	5

WEST TEXAS

	Comp.	Prod.	Dry	Gas	Rgs	Drg.
Andrews	5	3,689	0	1	2	5
Brewster	1	0	1	0	0	0
Crane	9	21,678	0	0	8	16
Concho	0	0	0	0	0	2
Cochran	6	2,979	0	0	2	12
Crockett	4	440	1	0	5	13
Ector	37	34,125	0	0	22	38
Gaines	22	16,047	1	0	7	24
Hockley	5	2,937	0	0	15	21
Howard	2	389	0	0	0	2
Hudspeth	0	0	0	0	0	2
Irion	0	0	0	0	0	1
Loving	0	0	0	0	0	1
Kimble	1	0	0	1	0	1
Mitchell	0	0	0	0	1	2
Pecos	12	816	2	0	18	27
Presidio	0	0	0	0	0	2
Reeves	0	0	0	0	0	1
Schleicher	0	0	0	0	0	1
Scurry	4	310	1	0	6	8
Stonewall	1	0	1	0	0	1
Sutton	0	0	0	0	1	3
Terrell	1	0	1	0	0	2
Terry	0	0	0	0	2	4
Tom Green	0	0	0	0	0	2
Upton	4	6,960	2	0	7	10
Ward	8	6,839	1	1	3	7
Winkler	8	2,161	0	0	7	6
Yoakum	26	20,599	0	0	21	32
Ttl. Oct.	156	119,969	11	3	126	249
Ttl. Sept.	126	104,691	14	0	27	202
Difference	30	15,278	3	3	99	47

TEXAS PANHANDLE

	Comp.	Prod.	Dry	Gas	Rgs	Drg.
Carson	11	1,386	0	3	2	8
Cottle	0	0	0	0	0	2
Dickens	0	0	0	0	0	1
Gray	12	2,068	1	0	7	18
Hansford	0	0	0	0	1	0
King	1	0	1	0	0	0
Lubbock	0	0	0	0	1	0
Hutchinson	27	6,481	2	2	6	28
Motley	0	0	0	0	0	1
Moore	2	0	0	2	0	4
Ochiltree	0	0	0	0	0	1
Swisher	0	0	0	0	0	1
Wheeler	2	27	1	0	1	7
Ttl. Oct.	55	9,962	5	7	18	71
Ttl. Sept.	36	5,702	2	7	29	66
Difference	19	4,260	3	0	11	5

EASTERN TEXAS

	Comp.	Prod.	Dry	Gas*	Rgs.	Dlg.
Anderson	3	183	1	0	2	7
Camp	0	0	0	0	1	0
Delta	0	0	0	0	0	1
Ellis	0	0	0	0	0	1
Falls	1	0	1	0	0	1
Fannin	0	0	0	0	1	1
Franklin	3	1,082	0	0	1	1
Freestone	3	262	0	1	3	6
Gregg	27	1,412	0	1	5	7
Henderson	0	0	0	0	0	2
Hopkins	0	0	0	0	0	1
Houston	2	0	1	1	0	2
Kaufman	0	0	0	0	0	2
Lamar	0	0	0	0	0	1
Leon	0	0	0	0	0	1
Limestone	3	550	1	0	0	3
McLennan	0	0	0	0	0	2
Nacogdoches	1	0	1	0	0	0
Navarro	5	191	3	0	0	4
Red River	0	0	0	0	0	1
Rusk	7	212	0	0	3	4
Smith	2	390	0	1	8	5
Titus	3	876	0	0	0	3
Upshur	4	62	1	0	0	3
Van Zandt	0	0	0	0	1	0
Wood	1	0	1	0	0	1
Ttl. Oct.	65	5,220	10	4	25	60
Ttl. Sept.	52	3,891	8	3	15	53
Difference	13	1,329	2	1	10	7

EAST TEXAS BORDER

Bowie	0	0	0	0	0	2
Cass	2	0	2	0	0	0
Harrison	2	0	0	2	0	0
Marion	3	590	0	0	0	5
Panola	0	0	0	0	0	1
Sabine	0	0	0	0	0	1
Shelby	3	0	3	0	0	1
Ttl. Oct.	10	590	5	2	0	10
Ttl. Sept.	8	55	1	1	2	18
Difference	2	535	4	1	2	8

*Gas production, Harrison County 34,500,000 cu. ft.

UPPER TEXAS GULF COAST

Alta Loma	0	0	0	0	0	2
Anahuac	4	2,529	1	0	1	2
Bay City	0	0	0	0	0	1
Batson	0	0	0	0	0	1
Big Creek	1	108	0	0	0	0
Boling	1	48	0	0	0	0
Caplen	1	146	0	0	1	0
Chocolate Bayou	0	0	0	0	0	2
Clear Lake	2	0	1	1	1	0
Clam Lake	1	124	0	0	1	0
Clay Creek	1	67	0	0	0	0
Danbury	1	0	0	1	0	1
Dickinson	0	0	0	0	0	0
Dyersdale	2	878	0	0	1	3
Esperson	1	655	0	0	0	3
Fannett	2	1,628	0	0	0	2
Fairbanks	3	280	0	1	1	0
Greens Lake	0	0	0	0	0	1
Ganado	1	28	0	0	0	0
Hardin	0	0	0	0	1	1
Hastings	1	0	1	0	0	1
Hillje	3	296	0	0	0	2
Hull	2	191	0	0	0	1
Humble	1	10	0	0	1	1
League City	0	0	0	0	0	1
La Belle	1	0	1	0	1	0
Lockridge	0	0	0	0	0	1
Lolita	13	1,590	0	0	2	6
Lovells Lake	3	330	0	1	0	2
Magnet	2	490	0	0	0	1
Manvel	1	0	1	0	1	0
Markham	1	0	1	0	1	0
Mauritz	1	0	1	0	0	0
Ogburn	2	282	0	0	1	1
N. Markham	1	253	0	0	1	0
Old Ocean	4	1,285	0	0	0	7
Pierce Jctn.	1	366	0	0	1	0
Port Neches	1	407	0	0	1	1
Red Fish Reef	1	288	0	0	0	2
Rowan	1	200	0	0	1	3
Saratoga	0	0	0	0	0	1
Seabreeze	2	854	1	0	1	0
Segno	3	1,107	0	0	1	2
S. China	2	0	2	0	0	1
Sour Lake	0	0	0	0	0	1
Spurger	1	401	0	0	1	1
S. Liberty	0	0	0	0	1	1
Sheridan	0	0	0	0	0	1
Texana	1	0	1	0	0	0
Thompson	4	2,071	0	0	1	3
Tomball	2	558	0	0	2	0
Van Vleck	0	0	0	0	0	1
W. Beaumont	0	0	0	0	0	1
W. Ganado	1	240	0	0	1	0
W. Ranch	10	3,786	0	0	3	10
W. Columbia	2	770	0	0	1	4
Withers	4	490	0	0	2	6
Miscellaneous	10	0	10	0	3	14
Ttl. Oct.	103	22,756	21	4	35	96
Ttl. Sept.	109	22,664	19	4	17	105
Difference	6	92	2	0	18	9

LOWER TEXAS GULF COAST

Agua Dulce	1	190	0	0	0	3
Baffin Bay	0	0	0	0	1	0
Ben Bolt	0	0	0	0	0	2
Bloomington	2	30	0	0	0	0
Clara Driscoll	1	32	0	0	0	1
Coletto Creek	2	20	0	1	0	1
Duck Bay	0	0	0	0	0	1
East Alice	0	0	0	0	0	1
E. Premont	0	0	0	0	0	1
E. White Pt.	1	133	0	0	0	1
E. Flour Bluff	2	265	0	0	0	2
Edwards Ranch	1	0	0	1	1	0
Escobas	0	0	0	0	1	0
Gallagher	1	0	1	0	0	0
Henshaw	1	212	0	0	0	1
Heyser	2	319	0	0	0	1
Fannin	1	0	1	0	0	0
Keeran	2	80	0	0	0	1
Lopeno	0	0	0	0	1	0
McCampbell	5	273	0	0	1	1
McFaddin	0	0	0	0	0	2
Midway	3	0	2	0	1	1
Orange Grove	3	371	1	0	0	1
Richard King	1	101	0	0	0	1
Riverside	0	0	0	0	0	1
Sandia	1	0	1	0	0	0
Shield	2	150	0	0	0	1
S. Clara Driscoll	1	85	0	0	0	7
St. Charles	0	0	0	0	0	1
Stratton	6	470	0	0	0	6
Telferner	1	56	0	0	0	0
Thomaston	0	0	0	0	0	1
Tomoconnor	4	2,560	0	0	1	1
Victoria	1	0	0	1	1	0
Wade City	9	782	1	0	1	5
Miscellaneous	8	0	8	0	1	15
Ttl. Oct.	62	6,129	15	3	10	60
Ttl. Sept.	51	6,145	11	3	10	58
Difference	11	16	4	0	0	2

SOUTH CENTRAL TEXAS

Bee Creek	2	220	0	0	0	1
Branyon	1	7	0	0	0	0
Carroll	0	0	0	0	1	0
Chicon Lake	1	1	0	0	0	1
Coffey	0	0	0	0	0	1
Day	0	0	0	0	0	1
Darst Creek	2	223	0	0	0	1
Elm Creek	2	3	1	0	0	1
Gas Ridge	4	6	1	0	1	0
N. Dale	1	15	0	0	0	0
Pearsall	3	278	0	0	1	1
Northwest Somerset	2	0	0	2	0	0
Salt Flat	0	0	0	0	0	1
Somerset	0	0	0	0	0	1
Tilmon	0	0	0	0	1	0
Miscellaneous	5	0	5	0	0	27
Ttl. Oct.	23	753	7	2	4	36
Ttl. Sept.	16	135	11	1	4	39
Difference	7	618	4	1	0	5

SOUTH TEXAS

Adami	1	0	1	0	0	0
Alta Mesa	1	0	1	0	0	0
Blas Uribe	1	0	1	0	0	0
Boyle	3	139	0	0	0	1
Bridwell	4	320	2	0	1	0
Bruni	0	0	0	0	0	1
Calliham	0	0	0	0	1	1
Casa Blanca	5	55	2	1	0	2
Cedro Hill	3	31	1	0	0	1
Charco Redondo	1	0	1	0	0	0
Colorado	11	1,674	0	0	2	2
Cuellar	1	0	1	0	0	0
Driscoll	2	205	1	0	1	1
Glen	4	430	0	0	1	2
Guiterez	1	0	1	0	0	0
Hoffman	0	0	0	0	1	1
Holbein	1	3	0	0	0	0
Kelsey	5	381	0	0	1	1
Lundell	9	461	1	0	1	0
Manila	3	326	0	0	1	2
Mirando Valley	0	0	0	0	0	1
N. Rincon	1	0	1	0	0	2
Northeast Rincon	1	71	0	0	0	1
Oilton	1	10	0	0	0	0
Ricaby	1	60	0	0	0	0
Rincon	5	758	0	0	0	3
San Jose	0	0	0	0	0	1
Samfordyce	2	63	0	0	1	1
Seven Sisters	0	0	0	0	0	1
Sun	1	33	0	0	0	1
Sactosa	1	0	1	0	0	0
Washburn	0	0	0	0	0	1
West Cole	1	0	1	0	0	0
White Creek	6	165	3	0	0	3
Yzaguirre	0	0	0	0	0	1
Miscellaneous	16	0	16	0	0	16
Ttl. Oct.	92	5,185	35	1	11	47
Ttl. Sept.	77	3,993	33	1	18	43
Difference	15	1,192	2	0	7	4

SOUTHEAST NEW MEXICO

Chaves	0	0	0	0	1	1
De Baca	0	0	0	0	0	1
Dona Ana	0	0	0	0	0	2
Eddy	22	1,521	7	2	8	39
Lea	28	9,330	2	0	10	36
Otero	0	0	0	0	0	2
Socorro	0	0	0	0	0	1
Ttl. Oct.	50	10,851	9	2	19	82
Ttl. Sept.	33	6,616	11	0	22	86
Difference	17	4,235	2	2	3	4

NORTH LOUISIANA

Bossier	13	120	0	0	0	8
Caddo	31	1,900	5	0	3	23
Catahoula	0	0	0	0	0	2
Claiborne	2	250	1	0	1	8
Concordia	1	0	1	0	0	0
De Soto	4	30	1	2	0	4
Franklin	0	0	0	0	1	0
Grant	2	0	2	0	0	2
La Salle	15	2,615	1	1	2	14
Morehouse	2	0	0	2	0	1
Ouachita	0	0	0	0	0	4
Red River	0	0	0	0	0	4
Sabine	2	35	0	0	2	4
Tensas	0	0	0	0	0	1
Union	2	0	0	2	0	2
Winn	1	0	1	0	1	0
Webster	3	350	2	1	0	4
Ttl. Oct.	68	4,950	14	8	10	81
Ttl. Sept.	78	5,050	13	10	2	71
Difference	10	100	1	2	8	10

*Gas production, in million cubic feet: De Soto Parish, 43; La Salle Parish, 5; Moorehouse Parish, 6.5; Union Parish, 4; Webster Parish, 4.9.
†Includes two injection wells in Bellevue field.

ARKANSAS

	Comp.	Prod.	Dry	Gas	Rgs.	Dlg.
Arkansas	0	0	0	0	0	1
Clark	0	0	0	0	0	2
Columbia	4	1,735	1	0	1	4
Dallas	0	0	0	0	0	1
Hempstead	0	0	0	0	0	1
Howard	0	0	0	0	0	1
Lafayette	2	70	1	0	1	1
Lonoke	0	0	0	0	0	2
Miller	2	0	2	0	0	0
Nevada	1	0	0	1	0	2
Ouachita	0	0	0	0	0	1
Prairie	0	0	0	0	0	1
Saline	0	0	0	0	0	2
St. Francis	0	0	0	0	0	1
Union	6	825	1	0	1	10
Ttl. Oct.	15	2,630	5	1	3	31
Ttl. Sept.	17	3,690	3	1	2	28
Difference	2	1,060	2	0	1	3

*Gas production, Nevada County 1,000,000 cu. ft.

COASTAL LOUISIANA

Anse La Butte	8	743	5	0	1	7
Barataria	0	0	0	0	0	1
Bateman Lake	0	0	0	0	1	0
Bayou Blue	2	316	0	0	0	2
Bayou Boullion	0	0	0	0	0	1
Bayou de Glaize	0	0	0	0	0	1
Bay St. Elaine	1	0	1	0	0	2
Bayou Pigeon	0	0	0	0	0	1
Belle Chasse	0	0	0	0	0	2
Caillou Island	1	348	0	0	0	1
Charenton	4	30	3	0	0	3
Choctaw	1	100	0	0	0	1
Chalkley	1	275	0	0	0	2
Chacahoula	0	0	0	0	0	2
Cheneyville	3	762	0	0	0	1
Chenier Ridge	1	129	0	0	0	0
Cameron Meadows	1	100	0	0	0	1
Darrow	0	0	0	0	0	1
Delta Farms	2	747	1	0	0	0
Dog Lake	0	0	0	0	0	1
E. Baton Rouge	2	495	0	0	0	3
Edgerly	1	233	0	0	0	2
Eola	1	373	0	0	0	1
Erath	1	66	0	0	0	0
Fausse Point	4	25	3	0	0	2
Gibson	0	0	0	0	1	0
Grand Bay	1	648	0	0	0	2
Golden Meadow	12	1,959	0	0	2	2
Garden Island	1	227	0	0	0	1
Gueydan	0	0	0	0	0	1
Hackberry	1	295	0	0	0	6
Happytown	0	0	0	0	0	1
Horseshoe Bayou	0	0	0	0	1	0
Iowa	2	1,366	0	0	1	5
Jeanerette	0	0	0	0	0	1
Jennings	2	533	0	0	0	4
Jefferson Island	1	259	0	0	0	1
La Fourche Crossing	1	304	0	0	1	0
La Fitte	2	573	0	0	0	2
Lake Mongoulois	0	0	0	0	0	1
Lake Hermitage	0	0	0	0	0	1
Lake Pelto	0	0	0	0	0	1
La Place	1	24	0	0	0	0
La Pice	0	0	0	0	0	1
Lake Salvador	0	0	0	0	0	1
Leesville	1	372	0	0	0	2
Neale	2	634	0	0	0	3
N. Crowley	2	761	0	0	0	1
New Iberia	5	1,249	1	0	0	3
Paradis	1	892	0	0	1	1
Port Barre	2	665	1	0	0	2
Plumb Bob	0	0	0	0	0	1
Potash	0	0	0	0	0	1
Quarantine Bay	0	0	0	0	0	1
Raceland	0	0	0	0	0	1
S. Crowley	1	475	0	0	0	1
S. Jennings	0	0	0	0	0	1
S. Roanoke	0	0	0	0	0	1
Starks	1	0	1	0	0	1
Schooner Bayou	0	0	0	0	0	2
Sulphur	1	176	0	0	0	2
Sweet Lake	1	389	0	0	1	0
Valentine	0	0	0	0	0	1
Vermilion Bay	1	0	1	0	0	1
Ville Platte	3	643	0	0	1	11
Venice	1	0	1	0	0	1
Welsh	1	0	1	0	0	1
W. Cote Blanche	1	535	0	0	0	1
W. Lake Verret	0	0	0	0	0	2
White Castle	0	0	0	0	0	1
Woodlawn	0	0	0	0	1	1
Miscellaneous	3	0	3	0	2	19
Ttl. Oct.	85	17,721	22	0	14	132
Ttl. Sept.	69	14,205	22	3	23	120
Difference	16	3,516	0	3	9	10

MISSISSIPPI

Attala	1	0	1	0	0	1
Carroll	0	0	0	0	1	0
Grenada	1	0	1	0	0	2
Itawamba	0	0	0	0	0	1
Jones	0	0	0	0	0	1
Kemper	0	0	0	0	0	1
Lamar	1	0	1	0	0	0
Lee	0	0	0	0	0	1
Marshall	0	0	0	0	0	1
Montgomery	0	0	0	0	0	1
Noxubee	0	0	0	0	0	1
Pike	0	0	0	0	1	0
Prentiss	0	0	0	0	0	1
Sharkey	0	0	0	0	0	1
Simpson	0	0	0	0	0	1
Tallahatchie	1	0	1	0	0	1
Tishimingo	0	0	0	0	0	0
Warren	0	0	0	0	0	1
Winston	0	0	0	0	0	3
Yalobusha	0	0	0	0	0	1
Yazoo	6	1,740	1	0	0	14
Ttl. Oct.	10	1,740	5	0	2	33
Ttl. Sept.	27	4,435	17	0	5	31
Difference	17	2,695	12	0	3	2

ALABAMA

Colbert	0	0	0	0	0	1
Fayette	0	0	0	0	0	1
Franklin	0	0	0	0	0	1
Houston	0	0	0	0	0	1
Madison	1	0	1	0	0	1
Marion	1	0	1	0	0	0
Mobile	1	0	1	0	0	0
Morgan	1	0	1	0	0	0
Walker	0	0	0	0	0	1
Ttl. Oct.	4	0	4	0	0	6
Ttl. Sept.	3	0	3	0	0	10
Difference	1	0	1	0	0	4

GEORGIA

Ttl. Oct.	0	0	0	0	0	2
Ttl. Sept.	2	0	2	0	0	2
Difference	2	0	2	0	0	0

FLORIDA

Dade	0	0	0	0	0	1
Ttl. Oct.	0	0	0	0	0	1
Ttl. Sept.	4	0	4	0	0	1
Difference	4	0	4	0	0	0

MONTANA

Big Horn	0	0	0	0	0	2
Blaine	0	0	0	0	0	3
Carbon	1	0	0	1	1	5
Fallon	0	0	0	0	0	3
Fergus	0	0	0	0	0	3
Glacier	14	1,260	3	1	0	16
Hill	0	0	0	0	0	1
Liberty	0	0	0	0	0	2
Petroleum	0	0	0	0	0	2
Phillips	2	0	0	2	0	16
Pondera	0	0	0	0	0	1
Toole	6	180	2	1	1	17
Miscellaneous	0	0	0	0	0	7
Ttl. Oct.	23	1,440	5	5	2	78
Ttl. Sept.	27	1,500	8	6	5	71
Difference	4	60	3	1	3	7

WYOMING

Albany	1	0	1	0	0	0
Big Horn	0	0	0	0	1	3
Carbon	0	0	0	0	0	6
Converse	0	0	0	0	1	2
Crook	0	0	0	0	0	1
Fremont	0	0	0	0	0	2
Hot Springs	0	0	0	0	0	3
Lincoln	2	2	1	0	0	6
Natrona	2	280	0	0	1	5
Niobrara	3	3,226	0	0	3	8
Park	1	0	0	1	1	2
Platte	0	0	0	0	0	1
Sublette	2	200	0	0	1	6
Sweetwater	2	1,420	1	0	0	7
Uinta	0	0	0	0	0	5
Washakie	1	0	1	0	0	1
Weston	4	2	3	0	1	10
Ttl. Oct.	18	5,130	7	1	9	68
Ttl. Sept.	20	6,549	5	1	5	66
Difference	2	1,419	2	0	4	2

COLORADO

Archuleta	0	0	0	0	0	1
Boulder	0	0	0	0	0	1
Custer	0	0	0	0	0	1
El Paso	0	0	0	0	0	1
Fremont	1	3	0	0	0	1
Garfield	0	0	0	0	0	1
Huerfano	0	0	0	0	0	1
Jackson	0	0	0	0	0	1
La Plata	0	0	0	0	0	1
Larimer	0	0	0	0	0	2
Las Animas	0	0	0	0	0	1
Lincoln	0	0	0	0	0	1
Logan	0	0	0	0	0	1
Moffat	1	209	0	0	0	3
Montezuma	0	0	0	0	0	1
Ouray	0	0	0	0	0	1
Park	0	0	0	0	0	1
Pueblo	0	0	0	0	0	1
Rio Blanco	0	0	0	0	0	5
Routt	0	0	0	0	0	1
Washington	0	0	0	0	0	1
Ttl. Oct.	2	212	0	0	0	35
Ttl. Sept.	1	14	0	0	1	36
Difference	1	198	0	0	1	1

NORTHWEST NEW MEXICO

McKinley	3	97	1	0	0	1
Bernalillo	0	0	0	0	0	1
San Juan	1	0	0	1	0	4
San Miguel	0	0	0	0	0	1
Socorro	0	0	0	0	0	1
Torrance	0	0	0	0	1	1
Valencia	0	0	0	0	0	2
Ttl. Oct.	4	97	1	1	1	11
Ttl. Sept.	2	72	0	1	1	13
Difference	2	25	1	0	0	2

MISSISSIPPI AND SOUTHEAST

Attala County Oil Test Due; Show Reported in Georgia

By GEORGE WEBER

JACKSON, Miss., Nov. 18.—Testing of a prospective oil-producing horizon in the Clint Crosby 1 Allen, Attala County, seemed assured this week as operators neared completion of preparations to perforate the wildcat. The test is bottomed at 4,534 ft. in the Tuscaloosa formation. An electrical survey showed a sand at 4,018-25 ft., in the Eutaw formation, which indicated oil saturation. Operators set 5½-in. casing at 4,086 ft. and will perforate in the sand horizon.

Ray & Rose, drilling 1 Fowler, near Soperton, Truetlen County, Georgia, have reported a show of oil at 2,135 ft., either Wilcox or Ripley. Live oil is reported to be covering the pit and operators have shut down the test and plan to resume shortly and possibly set casing.

Mississippi Exploration Declines

Mississippi exploration declined during the week, with one wildcat officially abandoned in Yazoo County and two others reported abandoned late in the week in Jones and Warren counties. New tests are believed definitely planned in Lauderdale and Stone counties, but permits for locations have not yet been issued. Geophysical shooting continues to fall off in Mississippi, with 23 crews now active in the state, mostly in the southern tier of counties, including Forrest, George, Rankin, Scott and Smith. Core drilling and soil-analysis surveys are finding increased use in supplementing geophysical information.

Tinsley activity is slackening, but important edge tests continue to add to the field's importance as a large crude reserve in the Woodruff sand. The field is approaching the 100-well mark, with over 75 per cent of its producers on the pump. Production continues high, averaging 15,000 bbl. daily, most of which is moving to refineries in Baton Rouge and Vicksburg.

The railroad loading rack and gathering system of the Exchange Oil Co. in the Pickens field, Yazoo County, has been purchased by Allied Pipe Line Co. of St. Elmo, Ill., and it is reported that that company will hereafter purchase the field's production, averaging about 1,175 bbl. daily.

The Jackson gas field of Hinds County is seeing an increase in development, with two tests now drilling for the shallow gas. The city of Jackson is nearing completion of a possible gas producer on fee property within the city limits, and a new operation by Stanford & Sellers on the north side of the city is beginning.

Wildcats

A show of oil is reported in the Kemper County wildcat, R. M. Crabb 1 Land at 1,750 ft. but no verification or further explanation is available. Fohs Oil Co. is under way on an important South Mississippi wildcat, 1 Batson-Hatten, Forrest County, which will be the second test to explore deep possibilities on a 70,000-acre block in Forrest and Perry counties.

Another Yazoo County wildcat, located northeast of Yazoo City, Edward DeLoach 1 Wilburn was abandoned last week after coring water sands in the Eutaw formation at 5,711-27 ft. and 5,885-5,917 ft. Total depth was 6,020 ft.

MISSISSIPPI COMPLETIONS

Wildcat—Yazoo County

Edward DeLoach 1 Wilburn, 6-12n-3w, T.D. 6,020 ft., dry, top Selma 4,823 ft., Eutaw 5,499 ft.

Tinsley—Yazoo County

Union 1 Perry-Woodruff unit, SW SE 13-10-3, 480 bbl., pumping Woodruff sand 4,620-50 ft., 7-in. casing 4,615 ft., T.D. 4,665 ft.

MISSISSIPPI DRILLING REPORT

Attala County

Gulf 1 S. J. Peeler, NE SE 35-15n-9e, drilling 3,256 ft.

Jones & Crosby 1 Allen, SW SW 33-13n-5e, S.D. 4,534 ft., set 5½-in. casing 4,086 ft., prepare perf. 4,018-25 ft.

Clarke County

Walsingham & Earles 1 School Land, SW SW NE 16-4n-15e, moving in material.

Grenada County

James Papadakis 1 Holcomb, SE NE 13-22-2e, drilling 1,909 ft.

Womble & Williams 1 Conn. Gen. Life Ins. Co., NW SE 28-23n-5e, S.D. 1,620 ft.

Forrest County

Fohs Oil Co. 1 Batson-Hatten, 10-1n-12w, spudded.

Jones County

T. N. Smith 1 Hollifield, NW SW NW 20-8n-12w, drilling 6,190 ft.

Kemper County

R. M. Crabb et al 1 Land, NW NE 12-10n-14e, reported show of oil 1,750 ft., may deepen.

Lee County

R. L. Shoemaker 1 Martin, SW SW NE 33-9s-6e, fishing 950 ft. in cherty lime.

Marshall County

C. B. Blosser 1 C. Stansback, SE SE 19-3s-4w, drilling 559 ft. in hard slate.

Montgomery County

E. R. Henderson 1 Columbian Mutual Life Ins., 36-21n-5e, S.D. 3,504 ft.

Noxubee County

Adams & Clements 1 Donohoe, SW SW 24-16n-17e, spudded.

(Continued on Page 95)

LEGAL

Department of the Interior, United States Land Office, Cheyenne, Wyoming. Notice is hereby given that a lease of the oil and gas deposits in lot 6 (NW¼ SW¼) and SW¼ SE¼ Sec. 6, T. 26 N., R. 89 W., 6th P.M., 81.64 acres, in the Wertz Dome (additional) oil and gas field, Wyoming, is offered to the responsible qualified bidder of the highest bonus per acre, the minimum bid to be $15.00 per acre, pursuant to the provisions of section 17 of the act of February 25, 1920 (41 Stat. 437), as amended, at the royalty rate scale in the lease form shown in circular 1386, at a sale to be held in the office of the Register of the district land office at Cheyenne, Wyoming, at 10:00 a.m. on December 18, 1940. The successful bidder will be required to deposit on the day of the sale a certified check on a solvent bank, or cash, for one-fifth of the bid, and file a showing of qualifications to receive the lease required by section 7 of General Land Office circular 1386. The remaining four-fifths of the bid, together with the annual rental in advance at the rate of $1.00 per acre, must be paid and a $5000 corporate surety bond must be furnished prior to the issuance of the lease. The successful bidder is required to subscribe to the unit plan of operation for the Wertz Dome field, as approved by the Secretary November 4, 1937. Bidders are warned against violation of the provisions of section 59 of the United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids at the discretion of the Secretary of the Interior. Register.

LEGAL

Department of the Interior, United States Land Office, Las Cruces, New Mexico. Notice is hereby given that lots 3 and 4, NE¼ SW¼ Sec. 31, T. 25 S., R. 37 E., N.M.P.M., New Mexico, containing 119.86 acres in the Jal Field, New Mexico, are offered to the responsible qualified bidder of the highest bonus per acre for lease under section 17 of the act of February 25, 1920 (41 Stat. 437), as amended by the act of August 21, 1935 (49 Stat. 674), at the royalty rate scale in the lease form shown in Circular 1386 at a sale to be held in the United States Land Office, Las Cruces, New Mexico, at 10 o'clock, a.m., Dec. 4, 1940. The successful bidder must deposit on the date of the sale a certified check on a solvent bank, or cash, for 1/5 of the amount bid, and file the showing of qualifications to receive a lease, required by section 7 of Circular 1386. The remainder of the bonus bid and the annual rental of $1.00 per acre must be paid and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. The bidders are warned against violation of the provisions of Sec. 59 of the United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids at the discretion of the Secretary of the Interior. Register.

Rocky Mountain Runs

Production estimates of principal fields for week ended November 16, 1940:

WYOMING

	(Bbl.)
Salt Creek	12,300
Big Muddy	1,260
Badger Basin	320
Black Mountain	150
Byron	20
Cody Dome	60
Cole Creek	630
Dallas Derby	490
Dutton Creek	60
Elk Basin	480
Frannie	3,160
Garland	2,980
Grass Creek	1,510
Hamilton Dome	180
Hidden Dome	70
Hudson	250
Iron Creek	10
LaBarge	2,150
Lance Creek	25,600
Lost Soldier	4,460
Mahoney	1,090
Medicine Bow	730
Mule Creek	220
Oregon Basin	6,460
Osage	600
Poison Spider	230
Quealy Dome	450
Rock River	2,540
Teapot	10
Warm Springs	70
Wertz	5,110
Total Wyoming	73,650

MONTANA

Kevin-Sunburst	4,940
Border	40
Cat Creek	490
Cut Bank	11,560
Dry Creek	60
Pondera	970
Total Montana	18,060

COLORADO

Iles Dome	1,660
Florence	90
Fort Collins and Wellington	310
Wilson Creek	610
Moffat	390
Greasewood	20
Rangely	100
Tow Creek	100
Price	140
Total Colorado	3,420

NEW MEXICO

Arrowhead	3,200
Cooper	2,890
Corbin	70
Eaves	640
West Eunice	290
Eunice	16,490
Halfway	220
Hardy	3,000
Hobbs	8,990
Jal	460
Langlie	4,000
Lynch	370
Lynn	830
Mattix	4,470
Monument	17,280
North Lynch	30
Penrose	4,630
Rhoades	230
Skaggs	70
Skelly	1,930
South Eunice	2,330
South Lovington	1,220
Vacuum	11,560
Artesia-Maljamar	17,150
Aztec-Bloomfield	10
Getty	100
Hogback	200
Rattlesnake	370
Table Mesa	100
Total New Mexico	103,130
Total Rocky Mountain region	198,260

$30 SAVES DRILLER $300.00

—using

PATTERSON-BALLAGH PIPE WIPER

"Besides wiping the pipe, one of my Patterson-Ballagh Pipe Wipers saved me two fishing jobs," reports one of the best known Drilling Superintendents in West Texas. "The fishing jobs would have cost me at least $150.00 each. Two elevator bolts dropped through the table and we picked them up on the Pipe Wiper. Each would have cost us at least one trip into the hole."

This Operator has drilled more than 200 wells in West Texas and equips all his rigs with Patterson-Ballagh Pipe Wipers, both going in and coming out of the hole. These Pipe Wipers will save you a lot of grief. Try them.

FOR FURTHER SAVINGS, USE

PATTERSON-BALLAGH PROTECTORS

PATTERSON-BALLAGH CORPORATION—Los Angeles . Houston . New York City

Personal Paragraphs

OLIN CULBERTSON, member-elect of the Texas Railroad Commission, was guest of honor at a barbecue sponsored by the volunteer fire department of Wharton, Tex., and Dr. T. W. Neal, leading citizen of that city, November 13. The barbecue was attended by several hundred oil men from all parts of the Texas Gulf Coast.

ROBERT L. PHILLIPPI, public-relations and advertising director for Union Oil Co., Los Angeles, Calif., has been elected a member of the National Association of Accredited Publicity Directors, which is said to be the public-relations counterpart of the bar and medical associations. Five years of service as a publicity or public-relations director are required for full membership.

H. I. FRY, assistant manager for Socony-Vacuum Oil Co., Inc., in Venezuela, and Mrs. Fry returned to South America last week after a visit in the United States.

H. D. COLLIER, president of the Standard Oil Co. of California, has been elected a member of the board of directors of the Anglo California National Bank of San Francisco.

W. A. PRUETT, vice president of Superior Oil Co. with offices in Los Angeles, Calif., has been elected executive vice president of the company. He is also a member of the board of directors.

V. H. LUDWIG, formerly assistant division manager at Toledo, Ohio, for the Gulf Refining Co., was presented with a diamond Masonic ring at a reception honoring his appointment to the Pittsburgh general office as assistant general manager.

THOMAS A. O'DONNELL, the first president of the A.P.I. and former president of California Petroleum Co., subsequently acquired by Texas Co., is back in his home at Palm Springs, Calif., where he spends each winter. He is at present enjoying good health.

SHELDON CLARK vice president of the Consolidated Oil Corp., commodore of the Yachtmen's Association of America, national commodore of the Sea Scouts of America and president of the Navy Council of Illinois, was elected president of the Navy League of the United States at its meeting in New York last week.

CHARLES E. GALLAGHER has been named chairman of the board of the East Ohio Gas Co., Cleveland, Ohio. He is a veteran of over 40 years' service with that company, of which he became president and general manager in 1933.

F. A. GRASER, a consulting engineer of Los Angeles, Calif., has been elected chairman of the Los Angeles Basin chapter of the A.P.I., and H. M. OLIVER, of Hancock Oil Co., has been elected vice chairman. CHARLES REICHERT, of National Supply Co., was elected secretary-treasurer and TOM MURPHY, of Martin-Decker, was elected assistant secretary-treasurer.

J. L. MATHIEU, sales manager of Schlumberger Well Surveying Corp., Houston, Tex., has returned to Houston following his release from the French Army, in which he was a lieutenant in the Air Corps. Mr. Mathieu went to France, his native land, in July 1939, on a vacation trip, expecting to remain there for a year, but answered the call to his country's colors when war was declared.

KELLER GRIGSBY, chairman of the Taft chapter of the California Natural Gasoline Association, had an exceptionally good program lined up this week, included in which was the story of Neoprene, the chemical rubber, which was presented with sound by Du Pont. W. L. RIFENBERICK summarized the methods and equipment for the separation of lighter hydrocarbons in a gasoline plant.

CYRIL AINSWORTH, of the American Standards Association, addressed the Bradford, Pa., group of the Department of Standards and Tests of the National Petroleum Association at Bradford on November 12 and the Oil City-Titusville group at Oil City, Pa., on November 13. He was presented to each group by JOSEPH E. KELLAR, of the National Petroleum Association and the Pennsylvania Grade Crude Oil Association.

Do You Remember?

From The Oil and Gas Journal Files

25 YEARS AGO

Crude-price increases are fairly general throughout the oil country, with "dollar oil" again becoming a reality in Oklahoma and Texas after many months of slim prices.

It is understood that T. N. Barnsdall will carry his Osage lease grievances to Congress in the hope that better treatment may be obtained there than in the Department of Interior.

The $250,000 surety bond given by Charles Page, Tulsa, in operating the Tommy Atkins lease in the Cushing field, has been increased to $850,000 by the federal court. Royalties from the lease already amount to more than the original bond.

20 YEARS AGO

After litigation lasting several years, Charles Page, Tulsa, has won title to the famous Tommy Atkins lease in the Cushing field. It was the government contention that Tommy Atkins was a mythical person and had never existed. Mr. Page proved to the satisfaction of the court that Mr. Atkins was no myth.

Director George Otis Smith of the U. S. Geological Survey told the A.P.I. convention in Washington that American petroleum resources were being exhausted rapidly and would last only 9 years and 3 months if depended upon to furnish all the power the country consumes.

10 YEARS AGO

After producing 700,000 bbl. of oil in the 10 months since it was completed, the discovery well in the Hobbs, N. M., field was deepened 109 ft., regaged for proration purposes, and recompleted for daily potential of 7,646 bbl. This one well has produced enough oil to pay costs of all operations of the Humble company in the field.

Poor showing of a well near the Joiner-East Texas discovery now seems to justify opinion of many geologists that the area is too far east for a major Woodbine pool.

BERT E. GAMBLE, land man for Lion Oil Refining Co., formerly stationed at El Dorado, Ark., has been transferred to Jackson, Miss.

HENRY LINAM, president of the Standard Oil Co. of Venezuela, sailed for Venezuela last week on the Grace liner Santa Rosa.

WALTER WARD CLOPTON, Wichita Falls, Tex., district pipe-line superintendent for United Gas Pipe Line Co., has been appointed district manager.

CLIFF L. McCOWN, geologist for Ohio Oil Co., has been transferred from Ohio back to the Forest City basin area of Illinois, where he was formerly stationed.

A. C. RUBEL, vice president of Union Oil Co., has returned to his office in Los Angeles, Calif., following a trip to Louisiana, where the company is drilling a second well near its discovery well in a new field.

T. B. GILBERT, superintendent of the Electra district for Magnolia Petroleum Co. and stationed at Electra, Tex., retired this month after 35 years with the company and its affiliated organizations.

R. O. EHTMAN, personnel director, Louark Producing Co., Shreveport, La., and E. H. BROWNE, safety director, U. S. Bureau of Mines, Baton Rouge, La. were honored guests at a banquet given in El Dorado, Ark., by Louark celebrating the winning of the national safety contest for rotary drilling by that company. Present were C. D. LEMLEY, in charge of drilling tools, and J. M. IVY, company safety director.

DR. A. J. ABRAMS, director of the field-research department of Magnolia Petroleum Co., Dallas, Tex., addressed the Magnolia Young Men's Club at a dinner held in Dallas Monday, November 18.

DR. WILLIAM C. MORSE, Mississippi State geologist, spoke on "Paleozoic Rocks of Mississippi" at the first technical meeting of the Mississippi Geological Society in Jackson recently.

MILTON M. UNGER, president of the Petroleum Drilling Co., formerly of Fort Worth, Tex., has announced the moving of company headquarters to Midland, Tex. The firm has properties in West Texas which are scheduled for development.

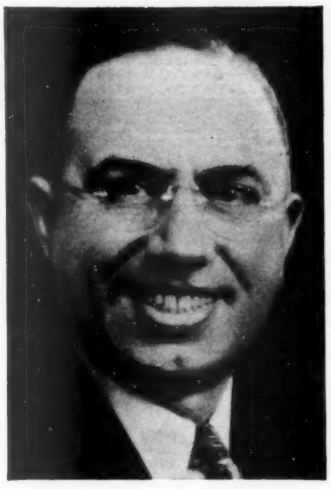
ROBERT B. CAMPBELL, president of the Peninsular Oil & Refining Co., Tampa, Fla., has been awarded the Achievement Medal of the Florida Academy of Sciences for his paper presented to the last annual meeting, entitled: "Outline of the Geological History of Peninsular Florida."

CHARLES B. CARPENTER, of the U. S. Bureau of Mines, Department of Interior, was the speaker before the Dallas Petroleum Geologists, Dallas, Tex., Monday evening, November 18. He spoke on measurements of compressibility of consolidated oil-bearing sandstones.

THOMAS RAE, production foreman, and LLOYD HETER, assistant production foreman for Shell Oil Co., Inc., in the Oxford and South Udall districts, Kansas, were hosts to a group of Wichita company executives and other oil men at a wild-game dinner in Oxford, Kans., last week. They served barbecued bear and roasted venison and elk, which they killed on a hunting trip in Wyoming.

Quarter Century in Gas

J. French Robinson, newly elected president and director of East Ohio Gas Co., is a native of Elizabeth, W. Va., where as a boy, he assisted his father in the operation of a gas plant. He was graduated from West Virginia University in 1915.



J. FRENCH ROBINSON

In 1921 he joined Peoples Natural Gas Co. as geologist and engineer. He made a 2-year study of the various sand horizons in the Appalachian fields, which required the study of 15,000 wells in Pennsylvania, Ohio, West Virginia, and Kentucky. For this work the University of Pittsburgh gave him the honorary degree of doctor of science in 1929.

Since 1930 he has been manager of the Lycoming Producing Corp., New York State Natural Gas Corp., and Keuka Construction Corp.

Mr. Robinson was elected vice president of Peoples Natural Gas Co. and Columbia Natural Gas Co. in 1933, and was made president of both companies in 1936. Under his direction, Columbia has since consolidated with Peoples.

He is a member of the American Institute of Mining and Metallurgical Engineers, American Association of Petroleum Geologists, American Petroleum Institute, American Mining Congress, American Gas Association, and is a director of the Pennsylvania Natural Gas Men's Association, the Engineers Society of Western Pennsylvania, and of the Union National Bank of Pittsburgh.

He has published several papers on geology, gas production, prospecting, and related subjects.

L. H. CARTER, Shreveport, La., accountant, has been named chief clerk for the Shreveport district, Louisiana Department of Conservation.

A. H. HENDERSON, superintendent of the Haynesville, La., district for Magnolia Petroleum Co., retired the past month after 23 years' service with the company.

ANTHONY FOLGER, president of the Kansas Geological Society and division geologist for Gulf Oil Corp., is in Centralia, Ill., attending a Devonian symposium.

LAWRENCE FENNELL, petroleum engineer with Arkansas Fuel Oil Co., Shreveport, La., will give a paper on "Repressuring the Homer Field" at the second fall meeting of the Ark-La-Tex chapter of the A.P.I. in Shreveport, December 3.

R. S. HUFFMAN, safety director of the Oklahoma Natural Gas Co., Tulsa, has been appointed state representative for the Oklahoma division of the National Committee for the Conservation of Manpower in Defense Industries.

EDWARD M. BORGER has been elected president of the Peoples Natural Gas Co., Pittsburgh, Pa., to succeed J. FRENCH ROBINSON, who has resigned to become president of the East Ohio Gas Co., Cleveland, Ohio. Mr. Robinson is the subject of this week's personality sketch on this page.

JOHN R. SUMAN, vice president of Humble Oil & Refining Co., has been elected president of the American Institute of Mining and Metallurgical Engineers, and will take office in February 1941. J. TERRY DUCE, vice president, California Arabian Standard Oil Co., of San Francisco, Calif., was elected to the board of directors.

Shifts: T. C. PRESTON, superintendent, Sinclair Prairie Oil Co., from Breckenridge, Tex., to Hobbs, N. M.; J. P. HOLLE, superintendent, Sinclair Prairie Oil Co., from Coahoma, Tex., to Breckenridge, Tex.; S. P. WEATHERBY, engineer, Seismograph Service Corp., from Henrietta, Tex., to Tulsa; R. M. BASS, superintendent, Sinclair Prairie Oil Co., from Troup, Tex., to Kilgore, Tex.; J. C. HALLAMAN, engineer, Ashland Oil & Refining Co., from Catlettsburg, Ky., to Dallas, Tex.; JAMES A. SMITH, engineer, Phillips Petroleum Co., from Rodessa, La., to Vivian, La.; E. R. BROCKWAY, geologist, Devonian Oil Co., from Shreveport, La., to Fort Worth, Tex.; TOMAS SUERO, geologist, Pure Oil Co., from Olney, Ill., to Tulsa; J. M. RICH, geologist, Carter Oil Co., from Vicksburg, Miss., to Meridian, Miss.; F. C. HENDERSON, president, Agua Dulce Co., from New York City, to Palm Beach, Fla.; C. L. WHITEMAN, engineer, Texas Co., from New Martinsville, W. Va., to Waynesburg, Pa.; ROLAND F. BEERS, president, Geotechnical Corp., from Brandon, Vt., to Cambridge, Mass.; W. G. SELBY, vice president, Selby Oil & Gas Co., from Ennis, Mont., to Sarasota, Fla.; BOB O. BIRD, superintendent, Phillips Petroleum Co., from Okemah, Okla., to Odessa, Tex.; WILLIAM J. DEVANEY, engineer, Cities Service Oil Co., from Bartlesville, Okla., to Great Bend, Kans.

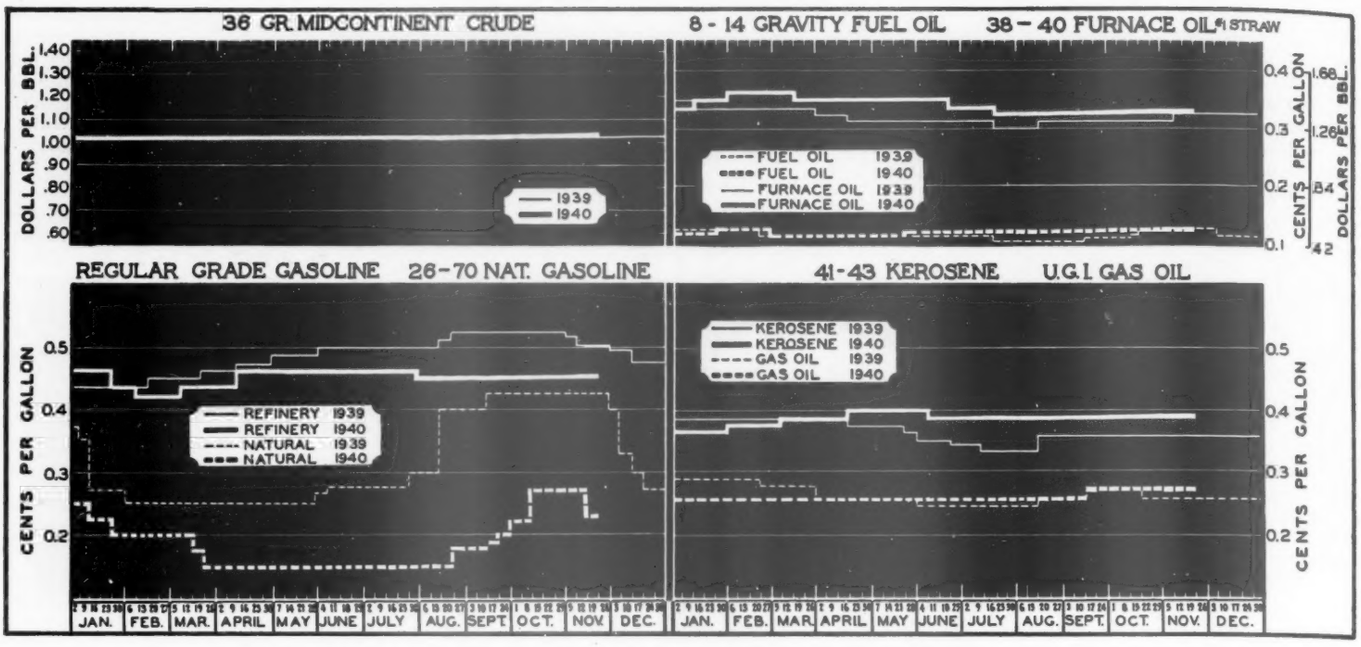
E. P. HAYES, of the Texas Co., Houston, Tex., has been appointed chairman of the program committee which will arrange the program for the spring meeting of the American Petroleum Institute's Division of Production. The meeting is scheduled to be held in Shreveport, La., on February 27 and 28.

HARRY A. LOGAN, Warren, Pa., refiner, is receiving congratulations on honors won by his 3-year-old chestnut gelding, Noble Knight, at the fifty-fifth National Horse Show at Madison Square Garden, New York City, on November 9. After topping all three-gaited saddle horses in the show on the opening day, Noble Knight, ridden by the owner's daughter, Miss Marian Logan, took the Biltmore challenge cup for park-type saddle horses. The Biltmore cup is one of the most highly prized trophies offered at the show. Mr. Logan's horse won two blue ribbons and two reds in four events.

JOHN W. GILBERT, with Gulf Oil Corp. in Venezuela, arrived in New York last week and is spending a vacation in Houston and Beaumont, Tex., with friends and relatives. He is the son of HARVEY W. GILBERT, oil operator of Beaumont.

J. L. MILLER, superintendent of the Deer Park (Houston, Tex.) refinery of Shell Oil Co., Inc., received a 20-year service award at a banquet given employes of the refinery who have been in the service of the company 10 years or longer. Six men received awards for 15 years of service, while 30 others received awards for 10 years or more of service.

DAVID E. HUMPHREYS, of Brookville, Pa., and JOHN E. SILVIS, of Sigel, Pa., veteran employes of the United Natural Gas Co., have been retired by that firm. Mr. Humphreys entered the service of the company in 1917. Since 1928 he has been a member of the company property-maintenance staff and has traveled over the territory frequently and thus is known to many company employes. Mr. Silvis has been employed by the firm for 33 years as a field worker.



Representative Mid-Continent Quotations on Crude Oil and Refined Products, Basis Oklahoma (Group 3)

Mild Search Starts in Group 3 Area For Replacement Fuel-Oil Stocks

By H. STANLEY NORMAN

SUBFREEZING temperatures throughout the northern part of the nation produced the winter's first impact on the fuel-oil market. Stock tanks in most consuming centers remain comfortably filled from accumulations during the off-season, preventing a scramble in the tank-car market that would have resulted from such a severe cold period in the latter part of the winter.

Refiners in the Group 3 territory are feeling the early call from distributors in the northern states for replacement stocks but the demand still lacks the vitality needed to boost quoted tank-car prices. The light-fuel-oil market is definitely stronger but the firming is insufficient to justify increase of quoted prices.

Refiners Tighten Restrictions

Manufacturers are limiting sales of distillates even more severely than in October. There is universal agreement that fuel-oil price increases are coming nearer with each passing day. Therefore, refiners are unwilling to load more than a few tank cars for spot-market demand. Belief that higher fuel-oil prices are near tends to make this market extremely active, although lethargy could develop promptly on abatement of temperatures and simultaneous release of stocks now in refinery storage. Conditions on both sides of the market are such as to produce an exaggerated impression of activity on the surface.

Scope of the distillate-fuel-oil inquiries following less than a week of intensive cold is probably the best indication obtainable that this market is headed into record-breaking activity. Consequently, there is no disappointment among refiners over failure of tank-car prices to react.

In the absence of movement to the Gulf Coast natural-gasoline prices in North Texas have reacted downward after clinging for 3 weeks to a top of 2½ cents per gallon. The North Texas price for interstate movement is now 2 cents and the Oklahoma quotation has slumped to 2¼ cents in sympathy with the Breckenridge weakness. The 18-lb. stabilized product in North Texas is quoted at 2⅜ cents while a range of 2⅝ to 2¾ cents exists in Oklahoma.

There was no measurable slackening in the northern movement of motor fuel this week although most refiners anticipate a reaction from the week of snow and subfreezing temperatures. There is usually a lag of 10 days or 2 weeks before reduced consumption is translated back into the refinery market in terms of shipments.

Meanwhile, motor-fuel prices quoted by Group 3 refiners are unchanged. Evidence is at hand showing gasoline consumption for the first part of November to have been almost as good as in October which in turn was probably a better motor-fuel month than September. Several refiners said that first half of November business was equal to or greater than the comparable part of October.

Gulf Coast refiners anticipate that higher fuel-oil prices will prevail in the coastwise market within a few weeks although another general advance in tank-wagon quotations on the eastern coast to offset increasing tanker rates appears the first logical move in that part of the country.

High Side of Market Prevails

There are fewer sales consummated currently at the low or middle of the tank-car range than at any time so far this winter, being the normal approach to a general advance of the market. Scattered sales of No. 1 straw oil in the Group 3 territory at 3¼ to 3⅜ cents have disappeared and the general quotation now ranges from 3⅜ to 3½ cents. Since there were some refiners previously asking the higher figures, however, this change hardly can be considered in the nature of an advance for that product.

It will be difficult to judge the real effect of the cold wave on the fuel-oil market until later this month. Most distributors have concentrated shipping instructions on contracts in the first half of November. Milder weather conditions would avoid immediate resort to the open market. On the other hand, the spot tank-car market for distillate fuels might be expected to react upward promptly if another similar cold wave develops before November ends.

Refined Oil Market Barometer

A mild push for open-market fuel-oil supplies is in progress this week and prices for distillate grades stiffened in resistance. The demand, despite record low temperatures in some parts of the country, is still insufficient to lift the general market. Refiners, however, are restricting shipments to limited quantities at the high of current quotations.

MID-CONTINENT. Gasoline shipments to northern customers remain surprisingly high for this season.

GULF COAST. Coastwise motor-fuel movement is so far disappointing in comparison to October.

CALIFORNIA. Gasoline, burning oils and diesel fuels are slightly stronger.

PENNSYLVANIA. Gasoline firm; neutrals moving briskly and bright stocks are slightly improved.

CHICAGO. Strength of the fuel-oil market is the feature of trading in this area.

Northeastern Fuel-Oil Market Firms as Demand Increases

By J. P. O'DONNELL

NEW YORK, Nov. 19.—The eastern refined-oil markets continued to exhibit all-around strength as the third week in November passed with every indication that recent gains would be maintained. The higher transportation rates from the Gulf-to-north-of-Hatteras ports, the principal factor in the current strength of the market, are not only expected to continue but there are many predictions that subsequent chartering will be accompanied by even higher rates.

Principal beneficiaries of the high transportation rates are fuel oil, both light and heavy, and kerosene, though gasoline has likewise benefited. Motor fuel of 72-74 octane remains quoted at from 5 to 5½ cents per gallon in the New York Harbor area and current reports are that this price is firm instead of exhibiting normal seasonal softness. Stocks of gasoline in the East Coast district registered their first gain of the season in the previous week, but the inclusion of the Armistice Day holiday last week is expected to show a decline in storage then. The gain in stocks in the first full week of November was of minor proportions, but gave the first possible indication that the high demand of the fall season has about reached its end.

Some suppliers were reported to be short of gasoline following the holiday demand, but stocks as a whole on the East Coast are still higher than they were a year ago. However, it was pointed out, in view of this year's greater domestic demand, stocks here now represent fewer days' supply than they did at the corresponding time a year ago. This factor plus the higher transportation rates accounts for the maintenance of the price this fall. No. 2 fuel oil in the New York Harbor area is now quoted at 4.5 cents per gallon, tank car, and 4.25 cents per gallon in barge lots. The tank-car price represents an increase of 0.4 cent since the late-summer low. Prices are higher all along the eastern seaboard, ranging from 4.25 cents per gallon at Charleston, S. C., and other southern points, to 4.6 cents in Boston and Providence and 4.7 cents per gallon in Portland.

Despite reports of substantially higher stocks of fuel oil this year, some suppliers are reported to be having difficulty meeting requirements. Large stocks are mostly in the hands of major companies and other large suppliers while several of the small distributors have already been caught short by sharp increases in demand. The latters' necessity of obtaining immediate supplies from the Gulf Coast has been a contributing factor in the rising tanker-rate situation with its resultant steadying of the entire price structure.

Demand for heavy industrial fuel oil is also said to be good as a result of the pickup in industrial operations due to the defense program which has stimulated many eastern industries. Bunker C fuel oil has yet to show an improvement in price but formerly persistent reports of price shading are not in evidence. Major companies continue their $1.25-per-barrel posting and a number of smaller suppliers, $1.15.

The third product to benefit from seasonal demand is kerosene, which is now generally quoted at 5.1 cents per gallon, an increase of 0.3 cent from previous levels. According to reports, only small quantities of kerosene are available currently in the spot market. Larger supplies of kerosene are on hand in the eastern area than heretofore, but this normally adverse influence has been entirely offset by the increased tanker rates also.

Abrupt advances of the tanker rates in the Gulf-to-north-of-Hatteras trade continued this week. Charters were reported this week covering November business at 56 cents for gasoline, 60 cents for kerosene and 64 cents for heating oils. The tanker rates are rapidly approaching the record highs prevailing during the first few months of the year when unprecedented demand for coastwise fuel-oil movement pushed the charter prices to 70 cents per barrel on a few cargoes.

Tankers in the Venezuela-to-north-of-Hatteras run were also obtaining better prices. A week ago the established rate for light crude oil was 32 cents per barrel, while successive charters during the past week raised it to 38 cents and later to 40 cents per barrel. A number of charters were reported consummated in the Venezuela-to-north-of-Hatteras trade last week. Another rate that rose to a new high for the year was California-to-Japan. A Panamanian tanker, the 3,808-ton Clifford, was chartered for November loading at $14 per ton, an increase of $2.50 from previous levels. The demand for tankers has been so strong in recent weeks that the few remaining layups, reported at six, are said to be preparing to reenter the coastwise trade.

The recent advances in tanker rates have benefited Pennsylvania refiners who have raised kerosene and fuel-oil quotations and who are experiencing an unusually good gasoline year. Increasing tanker rates extend the Pennsylvania market eastward and this gain in demand has imparted considerable strength to the Pennsylvania fuel-oil market in the last few weeks.

(Continued on Page 95)

Gulf Coast Markets

HOUSTON, Tex., Nov. 19.—Heavy fuel oils and kerosenes appeared to be in the best position of any products in the Gulf Coast refinery market at the opening of the week. Even in these products, however, there was no activity, but in view of the fact that there was not a great amount of material available, quoted prices were fairly firm. What fuel has moved has been at 80 cents, which seems to be a price at which the market is pegged. No attempt is being made to ask more than that figure, but at the same time it is doubtful whether that price could be shaded. Limited sources of supply for kerosene are preventing any weakening in that product, and those sources have very little material on hand, which offsets the lack of demand.

There is increasing uncertainty as to the status of light fuels and such burning oils. Although it is generally believed that there will be a big demand for these products that should have started before now, buying still is limited to small lots for immediate shipment. Sales reported were on the basis of 3¼ cents for No. 2 fuel.

Sharply rising tanker rates are being looked upon with increasing concern by Gulf Coast refiners who see in these increases a mounting check on better market prices on the Gulf Coast. Prices generally on the Gulf Coast are looked upon as extremely unsatisfactory, and until sufficient strength is developed in the Atlantic seaboard markets to more than absorb the tanker increases, Gulf Coast prices may suffer.

Gasolines again have settled into anybody's market. With stocks piling up as the result of lack of new business, some sellers are starting to push sales. This is looked upon as the forerunner of appearance of distress material. Quoted prices still are being held at previous levels of from 3¾ to 4 cents.

A.P.I. Weekly Refinery Statistics

Week Ended November 16, 1940

	Capacity reporting (per cent)	Total gasoline stocks (bbl.)	Residual fuel-oil stocks (bbl.)	Gas oil and distillate stocks (bbl.)	Daily crude runs (bbl.)
East Coast	100.0	18,148,000	12,114,000	17,452,000	543,000
Appalachian	91.0	3,186,000	389,000	551,000	107,000
Ind., Ill., and Ky.	90.2	13,747,000	3,532,000	5,884,000	581,000
Okla., Kans., and Mo.	76.9	6,242,000	2,213,000	1,593,000	255,000
Inland Texas	59.6	1,616,000	1,538,000	406,000	120,000
Texas Gulf	89.2	12,718,000	8,871,000	8,555,000	866,000
Louisiana Gulf	97.6	2,529,000	1,843,000	1,449,000	127,000
N. Louisiana and Ark.	51.5	417,000	537,000	340,000	46,000
Rocky Mountains	56.0	913,000	432,000	131,000	47,000
California	87.3	15,267,000	73,827,000	10,652,000	510,000
Total reported	86.2	74,783,000	105,296,000	47,013,000	3,202,000
Est. unreported		5,280,000	1,855,000	1,095,000	338,000
*Est. total		80,063,000	107,151,000	48,108,000	3,540,000
*Est. total previous wk.		79,847,000	107,687,000	48,408,000	3,510,000
*Nov. 17, 1939		75,170,000	112,054,000	38,917,000	3,515,000

*Bureau of Mines.

Stocks of Crude Oil in the United States

(BUREAU OF MINES ESTIMATE)

Week ended November 9, 1940	261,631,000 barrels
Week ended November 2, 1940	263,820,000 barrels
Week ended November 11, 1939	230,037,000 barrels

Figures do not include stocks of heavy, unrefinable California crude.

RETAIL OIL MARKETS...

Tank-wagon and filling-station prices on gasoline and kerosene furnished by larger marketing firms

Prices as of November 19, 1940

Taxes

The gasoline quotations given in the following tables include the 1½-cent federal tax, as well as state, county, and city taxes. The gasoline is the regular or standard grade. In most areas lower grades and a premium grade also are available.

Standard Oil Co. (Indiana)

	Gasoline: Tank wag.	Gasoline: Dlr.	Gasoline: Incl. tax	Kero. tank wag.
Chicago, Ill.	15.6	13.6	4.5	10.0
Decatur	14.6	13.1	4.5	9.5
Joliet	15.6	14.1	4.5	10.0
Peoria	15.6	13.2	4.5	10.0
Quincy	15.4	13.9	4.5	9.8
Davenport, Ia.	15.6	14.1	4.5	‡10.0
Des Moines	15.4	13.9	4.5	‡9.8
Mason City	15.8	14.3	4.5	‡10.2
Duluth, Minn.	16.4	14.9	4.5	10.8
Mankato	16.0	14.5	4.5	9.0
Minneapolis	16.0	14.2	4.5	10.4
LaCrosse, Wis.	17.0	15.5	5.5	10.4
Green Bay	17.4	15.9	5.5	10.3
Milwaukee	16.8	15.3	5.5	10.2
Detroit, Mich.	14.1	12.6	4.5	7.6
Grand Rapids	14.3	12.8	4.5	9.1
Saginaw	14.9	13.4	4.5	9.1
Evansville, Ind.	16.6	15.1	5.5	†9.8
Indianapolis	16.8	14.8	5.5	†10.0
South Bend	16.8	15.3	5.5	†10.0
Fargo, N. D.	18.2	16.7	5.5	11.6
Huron, S. D.	17.5	16.0	5.5	10.9
Kans. City, Mo.*	14.8	11.8	4.5	8.0
St. Louis*	15.2	13.2	4.5	9.0
St. Joseph	14.9	13.0	4.5	7.9
Wichita, Kans.	13.8	12.3	4.5	7.0

*State tax 2 cents, 1-cent city tax, and 1½-cent federal tax. †Does not include 4-cent state tax. ‡Does not include 3-cent state tax.

Exclusive of state general sales taxes.

Discounts to commercial consumers: On purchases per month off tank-wagon prices: 1,000 gal. or more, 1.5 cents off; minimum delivery 25 gal.

Stanolex Fuel Oil in Chicago

Effective Oct. 7, 1940, f.o.b. Chicago, tank-wagon prices: Standard heater oil, 1-99 gal., 8.75 cents; 100-149 gal., 7.75 cents; 150 gal. and over, 7.25 cents. Stanolex fuel oil No. 1, 1-99 gal., 8.5 cents; 100-149 gal., 7.5 cents; 150-399 gal., 7.25 cents; 400 gal. and over, 6.75 cents. Stanolex furnace oil, 1-99 gal., 8.5 cents; 100-149 gal., 7.5 cents; 150-399 gal., 7.25 cents; 400 gal. and over, 6.75 cents. Stanolex fuel oil A, 1-399 gal., 5.75 cents; 400-799 gal., 4.75 cents; 800 gal. and over, 4.5 cents. Stanolex fuel oil B, 1-399 gal., 5.75 cents; 400-799 gal., 4.75 cents; 800 gal. and over, 4.5 cents. Stanolex Bunker C fuel oil, 1-999 gal., 4.5 cents; 1,000 gal. and over, 3.5 cents.

Ohio

STANDARD OIL CO. OF OHIO

	Gasoline: Cons'r tank wag.	Gasoline: Dlr. vided	Gasoline: Incl. tax	Kero. tank wag.
Ohio points	16.0	15.0	5.5	*9.0

*Includes state tax of 1 cent.

Atlantic Coast District

STANDARD OIL CO. OF NEW JERSEY

	Gasoline: Cons'r tank car	Gasoline: Dlr. tank wag.	Gasoline: Incl. tax	Kero. tank wag.
Atlantic City	11.00	12.60	4.5	7.7
Newark	11.00	12.60	4.5	7.7
Annapolis, Md.	12.85	14.35	5.5	9.5
Baltimore	12.25	13.75	5.5	8.5
Cumberland	13.65	15.15	5.5	10.0
Washington, D.C.	10.50	12.00	3.5	9.5
Danville, Va.	14.45	16.95	6.5	11.0
Norfolk	13.25	15.75	6.5	10.5
Petersburg	13.55	16.05	6.5	11.2
Richmond	13.55	16.05	6.5	10.5
Roanoke	14.75	17.25	6.5	11.0
Charles'n, W. Va.	14.05	16.55	6.5	12.6
Parkersburg	13.35	15.85	6.5	11.2
Wheeling	14.35	16.85	6.5	11.8
Charlotte, N. C.	16.40	15.50	7.5	9.8
Hickory	16.95	18.45	7.5	10.3
Mt. Airy	16.80	16.00	7.5	10.2
Raleigh	16.15	16.00	7.5	9.5
Salisbury	16.45	14.50	7.5	9.9
Charleston, S. C.	14.25	16.75	7.5	9.25
Columbia	15.10	17.60	7.5	11.5
Spartanburg	15.80	18.30	7.5	12.2

Price basis to Essolene undivided dealers: Dealer tank-wagon price less 0.5 cent per gallon. Price basis to commercial consumers, effective March 8, 1937, in Maryland, District of Columbia, and in Arlington and Fairfax counties in Virginia; and March 12 in New Jersey: To contract accounts purchasing at least one full compartment at a time by hose connection, on yearly purchases: From 2,500 to 100,000 gal., consumer tank-wagon price at time and place of delivery; 100,000 gal. per year, consumer tank-car price plus 0.5 cent per gallon. Consumer tank-wagon price generally will be equivalent to dealer tank-wagon price less 0.5 cent per gallon.

Effective January 16, 1939, in North Carolina the commercial consumer schedule became as follows: Single deliveries of 50 gal. or more, consumer tank-wagon price. Single deliveries of less than 50 gal., 4 cents per gallon over consumer tank-wagon price. Generally the posted consumer tank-wagon price will be equivalent to the dealer price, less 0.5 cent per gallon. The above policy also applies in South Carolina, effective January 23, 1939.

Southern District

STANDARD OIL CO. (KENTUCKY)

	Gasoline: Cons'r tank wag.	Gasoline: Net dlr.	Gasoline: Incl. tax	Kero. tank wag.
Atlanta, Ga.	14.0	14.0	7.5	8.0
Augusta	16.5	16.5	7.5	9.5
Macon	15.0	15.0	7.5	9.0
Savannah	15.5	15.5	7.5	9.0
Birmingham, Ala.	16.5	16.5	8.5	9.0
Mobile	15.5	15.5	9.5	8.0
Montgomery	18.5	18.5	9.5	10.0
Jackson, Miss.	16.0	16.0	7.5	9.0
Vicksburg	16.0	16.0	7.5	8.5
Jacksonville, Fla.	16.0	16.0	8.5	8.0
Miami	16.0	16.0	8.5	8.0
Pensacola	17.5	17.5	9.5	8.0
Tampa	16.0	16.0	8.5	8.0
Lexington, Ky.	15.5	15.5	6.5	9.0
Covington	13.5	13.5	6.5	9.0
Louisville	15.0	15.0	6.5	8.5
Paducah	14.0	14.0	6.5	8.5

Price basis to tank-wagon consumers, effective January 4, 1937, 3 cents per gallon below tank-wagon price.

Montgomery, Ala., has a county tax of 1 cent per gallon, and a city tax of 1 cent per gallon on gasoline, in addition to state tax, and 1 cent per gallon on kerosene. Mobile, Ala., has a city gasoline tax of 2 cents per gallon; Birmingham, Ala., has a city gasoline tax of 1 cent per gallon; Pensacola, Fla., has a city gasoline tax of 1 cent. All are included in the table.

Pennsylvania and Delaware

ATLANTIC REFINING CO.

	Gasoline: Cons'r tank car	Gasoline: Dlr. tank wag.	Gasoline: Incl. tax	Kero. tank wag.
Philadelphia, Pa.	12.5	13.5	5.5	10.0
Pittsburgh	13.0	15.0	5.5	10.5
Allentown	13.0	14.5	5.5	10.5
Erie	12.5	15.0	5.5	10.0
*Scranton	11.9	12.4	5.5	10.5
Altoona	13.0	15.0	5.5	10.5
Dover, Del.	...	14.0	5.5	10.5
Wilmington	...	13.5	5.5	10.0

Price basis to undivided dealers, dealer tank-wagon price less 0.5 cent per gallon.

Discount on kerosene, 2 cents per gallon off tank-wagon price on tank-wagon deliveries of 25 gal. or more at one time.

*Voluntary discount of 1 cent allowed to dealers only.

Pacific Coast Territory

STANDARD OIL CO. OF CALIFORNIA

	Gasoline: Tank truck	Gasoline: Serv. sta.	Gasoline: Incl. tax	Kero. tank wag.
San Francisco	16.5	17.5	4.5	11.5
Los Angeles	16.0	17.0	4.5	10.0
Fresno, Calif.	17.5	18.5	4.5	12.5
Phoenix, Ariz.	20.5	21.5	6.5	*17.5
Reno, Nev.	19.5	20.5	5.5	13.5
Portland, Ore.	19.0	20.0	6.5	13.5
Seattle, Wash.	19.0	20.0	6.5	13.5
Spokane	20.5	21.5	6.5	16.5
Tacoma	19.0	20.0	6.5	13.5

*Includes 5-cent state tax.

Discount to dealers: On gasoline, off tank-wagon price, to 100 per cent dealers, 3 cents. To commercial consumers: On tank-wagon price; on single deliveries of 40 gal. and over, advance quantity discount extended at time of delivery, 3 cents. Service-station schedule applies on single deliveries less than 40 gal. On kerosene in tank-car, transport-truck, and trailer delivery, 3 cents off tank-wagon price; plant deliveries to jobbers, 2.5 cents below tank wagon.

March 18, 1939, split dealer discount was canceled.

New York and New England

SOCONY-VACUUM OIL CO., INC.

	Gasoline: Cons'r tank car	Gasoline: Dlr. tank wag.	Gasoline: Incl. tax	Kero. tank wag.
Albany	12.0	12.5	5.5	7.6
*Met. New York, Manhat., Bronx, Queens, Brklyn., Staten Island	11.9	12.0	5.5	7.9
Buffalo	12.4	13.4	5.5	7.7
Rochester	12.8	13.4	5.5	8.3
Syracuse	12.5	11.7	5.5	8.7
Portland, Me.	11.4	13.4	5.5	8.0
Manchester, N.H.	12.5	12.6	5.5	8.5
Burlington, Vt.	12.5	12.3	5.5	8.2
Boston, Mass.	10.4	11.4	4.5	8.0
Worcester	11.0	12.0	4.5	8.1
Hartford, Conn.	11.2	11.5	4.5	7.5
New Haven	10.9	11.1	4.5	7.0
Providence, R. I.	10.4	11.9	4.5	8.0

*Does not include 2 per cent city sales tax, which is calculated on basis of net retail price exclusive of state and federal taxes. Metropolitan New York prices are undivided dealer prices; others are split dealer.

Effective August 8, 1940, the company changed its commercial consumer policy in New York and New England to the following:

Full compartment deliveries: Accounts buying less than 20,000 gal. annually, 0.5 cent above the commercial-consumer price; accounts buying from 20,000 to 120,000 gal. annually, commercial-consumer price; accounts buying 120,000 gal. annually and above, 0.25 cent off consumer price. Split compartment deliveries: Delivery of less than a full compartment, 250 gal., commercial-consumer price plus 1 cent. Steel-barrel deliveries: Commercial price plus 3 cents.

Rocky Mountain District

CONTINENTAL OIL CO.

	Gasoline: Tank wag.	Gasoline: Incl. tax	Kero. tank wag.
Denver, Colo.	14.5	5.5	10.5
Grand Junction	16.5	5.5	12.5
Pueblo	15.5	5.5	9.0
Casper, Wyo.	16.5	5.5	11.5
Cheyenne	14.5	5.5	11.0
Billings, Mont.	16.5	6.5	12.0
Butte	15.5	6.5	13.0
Great Falls	15.5	6.5	12.0
Helena	15.5	6.5	12.5
Salt Lake, Utah	16.0	5.5	14.0
Boise, Idaho	†18.6	6.5	16.0
Twin Falls	†19.6	6.5	16.5
Albu'que, N. M.	*16.0	7.0	9.5
Roswell	*14.0	7.0	8.0
Santa Fe	‡17.0	7.5	9.5

*Includes city tax of 0.5 cent. †Includes toll-bridge tax of 1 mill. ‡Includes city tax of 1 cent.

Tank wagon represents price to consumers. Dealer represents price to dealers. If no dealer price is quoted, the tank-wagon price applies to all classes of trade.

Central South District

STANDARD OIL CO. OF LOUISIANA

	Gasoline: Cons'r tank car	Gasoline: Dlr. tank wag.	Gasoline: Incl. tax	Kero. tank wag.
New Orleans, La.	14.25	16.75	8.5	†11.0
Baton Rouge	14.75	17.25	8.5	‡10.5
Alexandria	14.75	17.25	8.5	‡10.5
Lafayette	15.00	17.50	8.5	‡10.0
Lake Charles	14.75	17.25	8.5	‡10.0
Shreveport	14.00	16.50	8.5	10.0
Knoxville, Tenn.	18.00	20.00	8.5	12.5
Memphis	16.00	18.00	8.5	11.0
Chattanooga	17.50	17.35	8.5	12.0
Nashville	17.00	17.50	8.5	11.0
Bristol	18.25	18.75	8.5	12.0

Essolene at dealer price less 0.5 cent per gallon to undivided dealers.

†Includes 1-cent parish tax and 1-cent state tax. ‡Includes 1-cent state tax.

Price basis to commercial consumers: Effective May 15, 1937, deliveries of 50 gal. or more in one territory take posted consumer tank-wagon price. Accounts taking deliveries of less than 50 gal. at one time pay posted consumer tank-wagon price plus 4 cents per gallon. Generally, the posted consumer tank-wagon price will be equivalent to the dealer price less 0.5 cent per gallon. Kerosene prices include 1-cent state tax.

Effective February 24, 1939, the company reestablished in New Orleans the commercial consumer policy on motor fuel effective in the rest of the state.

Effective December 12, 1938, the company revised its commercial consumer policy on motor fuel in New Orleans, as follows: Single deliveries of less than 50 gal., consumer tank car plus 2 cents per gallon 50 to 199 gal., consumer tank car plus 1 cent per gallon; 200 gal. and over, consumer tank car plus 0.5 cent per gallon.

Oklahoma and Arkansas

CONTINENTAL OIL CO.

	Gasoline: Tank wag.	Gasoline: Incl. tax	Kero. tank wag.
Texarkana, Ark.	13.5	5.5	6.0
Fort Smith	13.5	5.5	6.5
Little Rock	16.0	8.0	8.0
Muskogee, Okla.	13.5	5.5	7.0
Oklahoma City	11.5	5.5	6.5
Tulsa	12.5	5.5	6.0

Tank wagon represents price to consumers. If no dealer price is quoted, the tank-wagon price applies to all classes of trade.

Nebraska

STANDARD OIL CO. OF NEBRASKA

	Gasoline: Tank wag.	Gasoline: Dlr.	Gasoline: Incl. tax	Kero. tank wag.
Omaha	17.4	15.9	6.5	9.5
McCook	17.0	14.4	6.5	9.0
Norfolk	17.5	15.4	6.5	9.9
North Platte	17.8	15.5	6.5	10.2
Scottsbluff	17.4	14.5	6.5	10.8

Discounts to commercial consumers for tank-wagon deliveries covered only by standard commercial consumers contract, effective January 1, 1935.

Texas

	Gasoline: Tank wag.	Gasoline: Dlr.	Gasoline: Incl. tax	Kero. tank wag.
Dallas, Tex.	11.5	15.5	5.5	6.0
Fort Worth	11.5	15.5	5.5	7.0
Houston	12.0	16.0	5.5	8.0
San Antonio	12.5	17.0	5.5	8.0

Naphtha

STANDARD OIL CO. (INDIANA)

	Tank wagon*
Oleum spirits	16.2
V.M.&P. naphtha	16.5
Cleaners' naphtha	15.5
Stanisol	15.5

*Prices include 3-cent Illinois tax but not 1-cent federal tax nor 2 per cent retail occupational tax.

Prices f.o.b. Chicago. Each price subject to discount of 1 cent per gallon for 150-gal. lots if covered by contract.

Canada*

3-Star Imperial Gasoline
IMPERIAL OIL, LTD.

	Gasoline: Tank wag.	Gasoline: Incl. tax	Kero. tank wag.
Halifax, N. S.	24.5	10.0	18.0
St. John, N. B.	24.5	10.0	18.0
Montreal, Que.	24.0	8.0	16.5
Toronto, Ont.	24.5	8.0	17.0
Hamilton, Ont.	24.5	8.0	17.0
Winnipeg, Man.	27.5	7.0	22.5
Brandon, Man.	28.9	7.0	22.5
Regina, Sask.	25.0	7.0	20.0
Saskatoon, Sask.	28.0	7.0	23.0
Edmonton, Alta.	25.9	7.0	20.0
Calgary, Alta.	23.0	7.0	18.0
Vancouver, B. C.	21.0	7.0	23.0

*Imperial gallon used in Canada.

Divided dealers pay tank-wagon prices. Discount to undivided dealers, 1 cent below tank-wagon price. In Maritime Provinces both divided and undivided dealers pay tank-wagon price.

Tank-Wagon Changes

Standard Oil Co. of Kentucky reduced the dealer and tank-wagon price on gasoline at Augusta, Ga., 0.5 cent October 31 and raised the price 0.5 cent at Birmingham, Ala.

Standard Oil Co. of New Jersey reduced the dealer-tank-wagon price of gasoline 2.3 cents per gallon at Mount Airy, N. C., November 12. The dealer price was reduced 0.5 cent November 13 at Salisbury, N. C.

Continental Oil Co. reduced the tank-wagon price of regular gasoline 2 cents November 5 at Great Falls, Mont.

Standard Oil Co. (Indiana) advanced the tank-wagon price of gasoline at Grand Rapids, Mich., 1.3 cents and the dealer price 1.6 cents on November 7.

Socony-Vacuum Oil Co., Inc., advanced the tank-car price of gasoline 0.2 cent per gallon November 13 at Albany, N. Y.; Portland, Me.; Manchester, N. H.;

(Continued on Page 95)

PRICES OF REFINED PRODUCTS...

All quotations f.o.b. plant in cars for interstate or export movement except as otherwise noted

Prices as of November 19, 1940

The quotations are exclusive of the federal excise taxes of 1 cent a gallon on gasoline and 4 cents a gallon on lubricating oils. Octane ratings in Middle West, Mid-Continent, and Southwest are based on A.S.T.M. method of testing.

Refinery Gasoline

OKLAHOMA (Group 3)—

U. S. Motor grades:		
72-74 octane (regular)	.04½	.04¾
63-66 octane	.04	.04¼
60 octane and below	.03½	.03¾
60-62 400 grades:		
72-74 octane (regular)	.04½	.04¾
63-66 octane	.04	.04¼
60 octane and below	.03½	.03¾

NORTH TEXAS—

U. S. Motor grades:		
72-74 octane (regular)	.04½	.04¾
63-66 octane	.04	.04¼
60 octane and below	.03½	.03⅞
60-62 400	.03½	.03⅞

NORTH LOUISIANA (Ark. and N. La. delivery)—

U. S. Motor grades:		
72-74 octane (regular)	.04¾	.05
63-66 octane	.04¼	.04½
60 octane and below	.03⅞	.04⅛

ARKANSAS (Ark. and N. La. del.)—

U. S. Motor grades:		
72-74 octane (regular)		.04¾
60 octane and below		.04

CHICAGO (Based on Group 3)—

U. S. Motor grades:		
72-74 octane (regular)	.04⅝	.04⅞
63-66 octane	.04¼	.04½
60 octane and below	.03⅞	.04⅛
60-62 400 grades:		
72-74 octane (regular)	.04⅝	.04⅞
63-66 octane	.04¼	.04½
60 octane and below	.03⅞	.04⅛

PENNSYLVANIA (inland refineries)—

74-76 octane (regular)		.06
72-74 octane		.05¾

CALIFORNIA (domestic movement)—

58-60 400, 65 oct. and higher	.05½	.07¼
54-58 U. S. Motor	.04½	.06¼

EAST COAST (domestic)—

U. S. Motor grades:		
New York (Bayonne)*	.05	.06½
Philadelphia	.05½	.07
Boston		.05½
Baltimore	.05½	.07¼
Charleston, S. C.	.06½	.07

*All grades of gasoline ⅛ to ¼ cent less for barge shipments. New York Harbor prices are for New York and New England delivery. Prices for New Jersey delivery ¼ cent lower.

GULF COAST (domestic)—

U. S. Motor grades:		
72-74 octane		.04
70-72 octane	.03⅝	.04
68-70 octane	.03¾	.04
65-67 octane	.03⅝	.04

Natural Gasoline

OKLAHOMA (Group 3)—

Grade 26-70		.02¼
Grade 18-55	.02⅝	.02¾

NORTH TEXAS—

Grade 26-70		.02
Grade 18-55		.02⅝

CALIFORNIA—

75-85 375-390	.04½	.05¼

NORTH LOUISIANA (Ark. and N. La. delivery)—

Grade 26-70		.02½

Tractor Fuel

OKLAHOMA (Group 3)—

40-42 gr., 315-325 i.b.p., 110-flash, 540-550 e.p.	.03½	.03⅝
41-43 gr., 300-320 i.b.p., 110-125 flash, 500-520 e.p.	.03⅝	.03¾
46-48 gr., 210-230 i.b.p., 480-max., e.p.	.03⅞	.04

Kerosene

(All kerosene water white)

OKLAHOMA (Group 3)—

42-44	.03⅞	.04
41-43	.03¾	.03⅞

NORTH TEXAS—

41-43	.03¾	.03⅞

NORTH LOUISIANA (Ark. and N. La. delivery)—

41-43	.03¾	.04

ARKANSAS (Ark. and N. La. del.)—

41-43		.04¼

PENNSYLVANIA (inland refineries)—

46	.04⅞	.05⅛
45	.04⅞	.05

CHICAGO (Based on Group 3)—

42-44	.04	.04¼
41-43	.03⅞	.04⅛

CALIFORNIA (Pac. Coast market)—

38-43 high burning test	.04½	.05½

NEW YORK (Bayonne, N. J.)—

41-43	.051	.055

GULF COAST (domestic)*—

41-43	.03⅞	.04

*Barge price ⅛ cent lower.

Furnace Oil

OKLAHOMA (Group 3)—

Range oil	.03⅝	.03¾
No. 1 prime white, 38-42	.03½	.03⅝
No. 1 straw, 38-40	.03⅜	.03½
No. 2 straw, 32-36	.03¼	.03⅜
No. 3 zero to 10, 28-32	.03⅛	.03¼

NORTH TEXAS—

No. 1 prime white, 38-42		.03½
No. 1 straw, 38-40		.03⅜

NORTH LOUISIANA (Ark. and N. La. delivery)—

No. 2, 32-36	.03	.03⅛

ARKANSAS (Ark. and N. La. del.)—

No. 2, 32-36	.03¼	.03½

CHICAGO (Based on Group 3)—

Range oil	.03⅝	.03¾
No. 1 prime white, 38-40	.03½	.03⅝
No. 2 straw, 32-36	.03⅜	.03½
No. 3, zero to 15, 28-32	.03¼	.03⅜

NEW YORK (Bayonne, N. J.)—

*No. 1	.051	.055
*No. 2		.0450
*No. 4		.0450

*Barge deliveries ⅛ to ¼ cent under above tank-car price.

Gas Oil and Fuel Oil

(Gas oil per gal., fuel oil per bbl.)

OKLAHOMA (Group 3)—

U.G.I. gas oil, under 35	.02¾	.03
No. 5, low pour point, 18-22	.72½	.77½
No. 6, 15 and above, 8-14	.50	.55

NORTH TEXAS—

U.G.I. gas oil, under 35	.02⅝	.02¾
No. 5 low pour point, 18-22	.72½	.77½
No. 6, 15 and above, 8-14	.50	.55

NORTH LOUISIANA (Ark. and N. La. delivery)—

10-14 fuel oil, industrial		.70

CHICAGO (Based on Group 3)—

U.G.I. gas oil	.02¾	.03
No. 5, low pour point, 18-22	.75	.80
No. 5, 15 and above, 18-22	.60	.70
No. 6, low pour point, 10-16	.60	.70
No. 6, 15 and above, 10-16	.50	.55

PENNSYLVANIA (inland refineries)—

36-40	.04½	.05

CALIFORNIA—

Los Angeles:		
30-40 gas oil, per bbl.	1.10	1.25
24 plus diesel, per bbl.	1.10	1.25
24 plus diesel (bunkers)	1.20	1.35
12-16 (bunkers at tidewater)	.65	.75
10-16 (cargo lots)	.65	.75
12-17 (tank cars)	.50	.75
10-17 (high sulfur)	.45	.65
San Joaquin Valley:		
10-18 (tank cars)	.50	.70
24 plus diesel, per bbl.	1.10	1.25
San Francisco:		
24 plus diesel, per bbl.	1.35	1.40
24 plus diesel (bunkers)	1.40	1.50
10-16 (bunkers)	.75	.80

GULF COAST—

No. 2 fuel	.03¼	.03½
43-47 diesel	.03¼	.03½
48-52 diesel	.03½	.03⅝
53-57 diesel	.03⅝	.03⅞
58-and-above diesel	.03⅞	.04
Diesel bunkers		1.50
Bunker C (bulk cargoes)		.80
Bunker C (bunkers)		.80

NEW YORK (Bayonne, N. J.)—

27 plus, gas oil		.046
28-30 diesel (lighterage 6¼c per bbl.)		1.85
28-30 diesel (tank cars)		.045
Bunker C (to ocean-going ships in N. Y. Harbor	1.15	1.25
Industrial fuel (tank cars)	.04	.046

Lighterage charge 5c bbl. additional.

Bright and Steam Refined

OKLAHOMA (Group 3)—

200-210 D, 10-25		.18
150-160 D, 0-10		.13½
150-160 D, 10-25		.13
100-110 D, 0-10		.13
100-110 D, 10-25		.12½
Steam refined:		
600 dark green (untreated)		.07

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash):		
10 pour point		.14½
15 pour point		.13½
25 pour point	.12	.13
Steam refined:		
600	.07	.07½
650	.08	.08½
600 flash	.09	.09½
630 flash	.11	.12

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

0-10 pour point:		
150-3		.08
180-3		.08½
200-3		.08½
250-3		.10
280-3		.10½
280-4		.10
300-3½		.11
350-3½		.11½
400-3½		.12
500-3½		.12½
600-3½		.13
100-2½ paraffin oil, 10-25		.05¼
10-25 pour point:		
200-3		.08
250-3		.09½
280-3		.10
280-4		.09½

GULF COAST—

Pale oils:		
100-3	.05½	.05¼
200-3	.07½	.07¼
300-3	.07½	.07⅝
500-3½	.08¼	.08½
750-3½	.08⅝	.08¾
1,200-3½	.08¾	.08⅞
2,000-4		.09
3,000-4		.10½
Red oils:		
200-5-6	.06⅞	.07
300-5-6	.07¼	.07½
500-5-6	.08	.08¼
750	.08⅝	.08½
1,200-5-6	.08½	.08⅝

CALIFORNIA (moving to dom. market)

Pale oils:		
100-2½-3	.07¼	.08
200-2½-3	.07¼	.08
300-2½-3	.07¼	.08
400-3-4	.07½	.08
450-3-4	.07¼	.08
550-3-4	.09	.11
600-3-4	.09	.11
Red oils:		
200-4-5	.07¼	.08
300-5-6	.07¼	.08
350-5-6	.09¼	.11½
400-5-6	.09¼	.11½
450-5-6	.09¼	.11½
500-5-6	.09¼	.11½
600-5-6½	.09¼	.11½
700-6½ plus	.09¼	.11½
750-6½ plus	.09¼	.11½
900-6½ plus	.09¼	.11½

PENNSYLVANIA—

150 vis., at 70° F., 3 color, 400-405 flash:		
Zero pour point		.22½
10 pour point		.21½
15 pour point		.20½
25 pour point		.19
200 vis., at 70° F., 3 color:		
Zero pour point		.24½
10 pour point		.23½
15 pour point		.22½
25 pour point		.21

Wax and Petrolatum

(Prices per pound)

OKLAHOMA (Group 3)—

124-126 (A.m.p.) w.c. scale	.02½	.03

PENNSYLVANIA (inland refineries)—

122-124 (A.m.p.) w.c. scale	.02⅞	.03
124-126 (A.m.p.) w.c. scale	.02⅞	.03

NEW YORK—

Wax in bags fully refined:		
125-127 (A.m.p.) wax		.0560
128-130 (A.m.p.) wax	.0560	.0570
130-132 (A.m.p.) wax		.0585
133-135 (A.m.p.) wax		.0615
135-137 (A.m.p.) wax		.0640
Crude scale:		
124-126 (A.m.p.) w.s.	.02⅞	.03
124-126 (A.m.p.) y.s.	.02⅞	.03
Petrolatum in barrels, carload lots:		
Dark green	.02125	.02625
Amber	.02375	.02875
Extra amber	.02625	.03000
Lily white	.04375	.05125
Snow white	.05125	.06000
Cream	.03375	.04125

Export Prices

GASOLINE

GULF COAST—

U. S. Motor		.03⅝
60-62 400		.03⅝
61-63 390	.03⅞	.04
64-66 375	.03⅞	.04

LOS ANGELES—

U. S. Motor grades:		
Above 69 octane	.05½	.05¾
65-69 octane	.05¼	.05½
60-65 octane	.04½	.05

KEROSENE

GULF COAST—

41-43 water white	.04	.04½

LOS ANGELES—

41-43 water white	.05	.05¼

LUBRICANTS

(Pennsylvania Grade)

NEW YORK (f.a.s. in bbl.)—

Cylinder stocks:		
600 S.R. unfiltered		.16
630 S.R. unfiltered		.17
600 flash, S.R.		.18
650 flash, S.R.		.20
Bright stock:		
Light, 25 pour point		.20½

NEUTRAL OIL

200-3 color		.27
150-3 color		.25½

PARAFFIN WAX

NEW YORK (prices per lb.)—

123-125 A.m.p.		.05600
125-127 A.m.p.		.05600
128-130 A.m.p.		.05850
133-135 A.m.p.		.06150
135-137 A.m.p.		.06400
Crude scale:		
124-126 w.s.	.02⅞	.03
124-126 y.s.	.02⅞	.03

MARKET RECORD OF ACTIVE OIL STOCKS . . .

Compiled by Carl H. Pforzheimer & Co., 25 Broad Street, New York City, Member New York Stock Exchange and New York Curb Exchange

New York Stock Exchange

1940 High	1940 Low	Week ended Nov. 16 High	Week ended Nov. 16 Low	Week ended Nov. 16 Close	Stocks—	Total shares outstanding	Par value	Latest dividend	Payable or last paid	Dividends paid in 1939	Com. sh. earn. 1939	Com. sh. earn. 1938	1939 High	1939 Low	1938 High	1938 Low
58½	38½	51½	46⅝	50½	Amerada Corp.	788,675	N.P.	50cQ	10-31-40	$2.00	$1.56	$2.07	74½	50	78	55
27⅛	18¼	24⅜	23⅛	23¼	Atlantic Refining	2,663,999	$25	25cQ	12-16-40	1.00	1.66	1.40	24¾	18⅛	27⅜	17¾
16⅝	8½	11¾	11	10⅝	Barber Asphalt Co.	390,223	$10	25c	5-21-40	.25	1.39	—.85	21	10¼	23¾	12⅛
13⅜	7⅛	10½	9¾	9¾	Barnsdall Oil Co.	2,558,779	$5	15c	12-9-40	.90	.76	1.26	19½	11⅛	21⅜	10⅛
8⅛	5½	6⅜	6	6¼	Consolidated Oil Corp.	13,751,726	N.P.	12½cQ	11-15-40	.80	.55	.55	9⅞	6½	10⅜	7
25	16⅛	20½	19	20⅛	Continental Oil of Delaware	4,682,572	$5	25cQ	9-30-40	1.00	1.35	1.10	31½	19⅞	35¾	21¼
6⅞	3⅜	5	4¼	4⅝	Houston Oil	1,098,618	$25		10-17-30		.43	.83	9⅝	4½	9¾	5
14⅜	8	11⅜	10⅝	11¼	Lion Oil Refining	435,815	N.P.	25cQ	10-10-40	1.00	1.50	2.09	18⅛	10	25⅛	15⅝
17⅜	11½	15¼	14	15	Mid-Continent Petroleum	1,857,912	$10	40c	12-2-40	.60	1.42	.56	18	11⅛	22⅝	12¼
11	7⅛	11⅜	9¼	11¼	Mission Corporation	1,378,645	$10	25c	12-20-40	.65	.87	1.04	14⅞	8¾	17⅜	10⅝
9¾	4⅝	8⅛	6¾	7¼	National Supply	1,155,517	$10		12-22-37		—.87	—.79	15½	5⅝	23	12½
8¾	5⅜	7⅞	7¼	7¼	Ohio Oil Co.	6,563,377	N.P.	25c	12-14-40	....	—.10	.25	10½	6	14⅞	8⅞
8¼	5½	7¾	6⅞	7¾	Pacific Western Oil	1,000,000	N.P.	40c	12-19-39	.40	.81	1.22	11⅞	7	15⅞	10¼
10½	6¾	9	9	9	Pan American Pet. Trans.	4,702,945	$5		12-21-39		1.10	.08	8¾	5	9¼	6¼
41¾	27⅛	39⅞	38¼	39⅝	Phillips Petroleum	4,449,052	N.P.	50cQ	11-30-40	2.00	2.21	2.03	46½	31¼	44⅜	27¼
22¾	15	18⅞	17	18⅞	Plymouth Oil Co.	1,038,633	$5	25c‡	12-23-40	§1.40	2.38	2.59	24	17⅛	25⅜	15
11½	6¾	9	8	8½	Pure Oil Co.	3,982,031	N.P.	25c	12-20-40	.25	1.11	.38	11¾	6⅛	13½	8¼
8⅝	6⅞	8¾	8	8⅝	Richfield Oil Corp.	4,010,000	N.P.	50c	12-18-39	.50	.65	.51	10¼	6⅝	9⅞	5
20	11	16¼	14⅝	15¼	Seaboard Oil of Delaware	1,244,383	N.P.	25cQ	9-14-40	1.00	1.40	1.52	24⅝	15½	27½	15½
13⅜	7⅝	11¼	10	10	Shell Union Oil	13,070,625	N.P.	25c	7-16-40	.50	.77	.72	17¼	9⅞	18⅜	10
23¼	12¼	22½	21¼	21⅞	Skelly Oil	995,349	$15	50c	12-20-40	.75	1.99	2.27	29½	15½	34⅜	18½
12½	7⅛	10	9	9¾	Socony-Vacuum	31,206,071	$15	25cSA	9-16-40	.50	1.10	1.29	15⅛	10¼	16⅜	10⅜
26⅛	16¼	20⅜	19½	20	Standard Oil of California	13,003,953	N.P.	25cQ	12-16-40	1.10	1.38	2.22	33⅝	24¼	34⅞	25⅛
29	20¾	27¾	27	27¼	Standard Oil (Indiana)	15,272,020	$25	50c†	12-16-40	1.25	2.23	1.82	30	22¾	35½	24¾
46½	29⅞	38	35⅜	36	Standard Oil of New Jersey	27,280,998	$25	75c†	12-16-40	1.25	3.26	2.86	53½	38	58⅜	39¾
65⅞	46¾	53⅞	50½	53	Sun Oil	2,434,863	N.P.	25cQ	12-16-40	1.00	2.74	1.07	66	45¾	65⅛	45
2½	1⅛	1¾	1½	1⅝	Superior Oil Corp.	1,388,979	$1	10c	12-28-38	....	.04	.24	3⅝	1⅜	4¼	1¾
47⅝	33	39⅞	38	38⅞	Texas Corp.	10,876,139	$25	50cQ	10-1-40	2.00	3.02	2.13	50¾	32½	49⅝	32⅝
4¼	2½	3⅝	3⅛	3⅜	Texas Gulf Producing Co.	888,146	N.P.	10c	12-14-40	.20	.69	.86	5¾	3¼	5⅞	2⅝
8⅝	5⅜	6½	6⅛	6⅜	Texas Pacific Coal & Oil	888,236	$10	10c	12-2-40	.40	1.00	1.16	11⅝	7	12½	7
12	8¾	10⅜	9½	10⅛	Tide Water Associated	6,371,827	$10	15c	12-2-40	.80	1.05	1.28	14¼	9½	15⅜	10⅛
17½	12	13⅞	13⅜	13½	Union Oil Co. of California	4,666,270	$25	25c	11-10-40	1.05	1.25	1.47	19⅜	15⅛	22½	17⅛
29⅞	22¾	27½	27	27	Union Tank Car Co.	1,177,381	N.P.	45c	12-2-40	1.30	2.07	1.16	24¼	20⅛	23½	20
3⅝	1¾	2¼	2	2⅛	Wilcox Oil & Gas	470,768	$5	10c	2-15-40	....	.77	.52	4¼	2⅜	3½	1⅝

•Also 5 per cent in stock. †Includes extras. ‡Also 2 per cent in stock. §Also 4 per cent in stock. ‖Also 2½ per cent in stock. ¶Also 1½ per cent in stock. —Deficit.

New York Curb Exchange

1940 High	1940 Low	Week ended Nov. 16 High	Week ended Nov. 16 Low	Week ended Nov. 16 Close	Stocks—	Total shares outstanding	Par value	Latest dividend	Payable or last paid	Dividends paid in 1939	Com. sh. earn. 1939	Com. sh. earn. 1938	1939 High	1939 Low	1938 High	1938 Low
10¾	4½	6¾	5¾	6	American Republics Corp.	1,308,049	$10	10c	7-11-38	....	$0.14	—.22	11¾	5½	11¾	5
3¼	1⅝	2⅜	2⅛	2¼	Bridgeport Machine Co.	263,700	N.P.	$1.25	12-30-37	....	—.95	—.14	7¼	2½	10¼	4⅞
43	28	38⅞	38⅞	38⅞	Buckeye Pipe Line Co.	200,000	$50	$1	12-14-40	$2.50	3.13	2.36	34¾	26½	39	22½
117	105	106¼	105½	106¼	Chesebrough Mfg. Co.	120,000	$25	$1.50Q†	9-23-40	6.00	7.87	5.32	130	108⅝	128	97
6¾	4	6⅜	5⅞	6⅛	Cities Service (new)	3,703,978	$10	....	6-1-32	....	.68	.23	9¼	4¼	11	5⅛
2⅛	⅛	1	1	1	Cosden Petroleum	465,332	$1	.....	.....	....	....	....	2¼	½	2⅜	⅞
24¼	11⅝	16⅝	15	16¼	Creole Petroleum	6,974,356	$5	50cSA†	12-16-40	1.00	1.38	1.64	28	16¾	27½	17½
4⅜	2⅞	4⅜	4	4	Darby Petroleum	351,390	$5	25cSA	1-15-39	.25	.03	.69	7⅛	3⅝	10¼	5½
2	1	1⅛	1⅛	1⅛	Derby Oil & Refining	263,162	N.P.	....	.....	....	—.37	—.91	2⅝	1½	3½	1½
31	22	22	22	22	Eureka Pipe Line	50,000	$50	50c	11-1-40	2.00	.63	—.37	23	15⅛	31	16
39⅞	25⅛	34	31¼	33¼	Gulf Oil Corp.	9,076,202	$25	25cQ	10-1-40	2.00	1.69	1.43	45⅛	29¼	46⅞	33
68	47⅛	62	59¼	61¾	Humble Oil & Refining	8,987,840	N.P.	62½c	12-26-40	2.00	3.33	3.98	71	52½	72⅝	56
12⅜	5½	7¾	7⅜	7½	Imperial Oil of Canada	26,965,078	N.P.	25c	12-2-40	1.00	.71	.96	17	11⅜	19½	14⅛
7¾	3	3¾	3⅝	3¾	Indiana Pipe Line	300,000	$7.50	20c	11-15-40	.50	.33	.47	7¼	5½	9⅜	6
19¾	8¼	11¼	10⅜	10⅝	International Petroleum	14,324,088	N.P.	50c	12-2-40	1.75	1.19	1.98	27½	17	31¼	21
2¾	1⅝	1⅞	1⅞	1⅞	Kirby Petroleum Co.	500,000	$1	10c	4-15-38	.	.06	.14	3¾	2⅛	5	2⅛
10¾	7⅝	10⅜	10⅛	10¼	Lone Star Gas	5,518,347	N.P.	30c	12-21-40	.70	.98	.88	10½	7⅛	10⅜	6⅝
6¼	3¾	4⅞	4½	4⅞	Louisiana Land & Exp.	2,966,762	$1	10c	9-14-40	.35	.22	.45	7¾	4	9⅜	6½
17	9¼	..	..	..	Margay Oil Corp.	149,943	N.P.	25cQ	10-10-40	1.00	1.52	2.28	17	14½	24	16
8½	6½	8	7⅝	8	Midwest Oil Co.	998,474	$10	45c	12-16-40	.90	.99	.93	8¾	6⅝	9¾	6⅝
6¼	4⅞	6⅛	6	6	Mountain Producers	1,593,584	$10	30cSA	6-15-40	.60	.70	.62	6	4⅞	5¾	4½
13⅛	10	11⅝	11½	11½	National Fuel Gas	3,810,183	N.P.	25cQ	10-15-40	1.00	.95	.84	14	11¼	14⅝	11½
12½	8¾	10¾	10⅝	10⅝	National Transit	509,000	$12.50	50c	6-15-40	.85	.91	.88	9½	7¼	9¼	6½
1¾	¾	1⅛	1	1	New Mexico and Arizona	1,000,000	$1	1c	12-1-37	.	.02	.02	1¾	1	2⅝	1½
7¾	5¼	6¾	6¾	6¾	New York Transit	100,000	$5	25c	9-20-40	.40	.88	.16	6	4	4½	3½
9⅞	6	8¾	8¾	8¾	Northern Pipe Line	120,000	$10	40c	12-2-40	.30	.31	.24	7	4½	6	4
5½	2½	4	3½	3⅞	Pantepec Oil	2,856,872	$1	....	.....	....	....	....	7⅝	4	7¾	3½
3¼	1¼	2	1¾	1¾	Root Petroleum Co.	336,045	$1	25c	2-1-37	....	.70	.17	5	1¼	4½	1⅝
2½	1½	2¾	2½	2⅝	Ryan Consolidated	298,931	N.P.	....	.....	....	.16	.29	3	1⅞	4	2⅛
11¾	4¾	5⅝	5½	5⅝	Southern Pipe Line	100,000	$10	25c	9-3-40	.30	.25	—.27	4⅞	3½	5⅜	3¼
44	28	36½	34½	35½	South Penn Oil	1,000,000	$25	37½c	9-27-40	3.00	2.84	1.44	40½	26¾	39	28¾
35	21	..	..	..	Southwest Penna. Pipe Lines	35,000	$50	50c	9-16-40	2.00	2.06	—.41	23	18	22¼	16½
20⅞	16½	20¼	19½	19½	Standard Oil of Kentucky	2,604,790	$10	25c	9-14-40	1.30	1.53	1.45	20⅛	17¼	18¾	15
41⅜	26¼	35	34	34	Standard Oil of Ohio	753,740	$25	25c	9-14-40	1.50	6.64	1.81	32¾	17	22¾	16¼
2	1⅜	1⅝	1½	1¾	Sunray Oil	1,975,876	$1	5c	12-20-40	.10	.25	.23	2¾	1¾	3¼	2
3⅛	2	2⅞	2¾	2⅞	Texon Oil & Land	936,024	$2	10c	12-30-40	.10	.49	.56	4	2⅝	5¼	3½
3⅜	2	2⅜	2	2⅛	Transwestern Oil Co.	750,000	$10	....	.....	....	—1.42	.12	6	2½	5¼	2⅝
2⅛	⅛	1¼	1	1	United Gas Corp.	7,818,959	$1	....	.....	....	—.55	—.51	3⅜	1½	5¼	2⅝

†Includes extras. —Deficit.

EQUIPMENT PROGRESS...

Ideal Rotary Connector For Light Rigs

The wide acceptance and universal approval of operators using the Ideal Type DA-30 rotary connector on heavy-duty rotary rigs has prompted the National Supply Co., Pittsburgh, Pa., to develop its Type D-6 connector for lighter rotary use.

In use, the connector replaces the conventional rotary hook with a yoke from which elevator links can be independently suspended. Drill pipe is handled in the usual manner, and a special adapter, which is easily attached to the swivel bail, provides a means of carrying the swivel with the regular elevator when drilling.

The arrangement of carrying the elevator links independently of each other makes for increased flexibility in handling the elevator when running drill pipe, greatly facilitating opening and closing of the elevator, while vertical suspension of each link provides a better balance of the loads on the elevator.

Carrying the swivel below the elevator links has decided advantages. It eliminates the practice of the links resting and pounding against the swivel, and there is no chance of the links bumping against the swivel bail or interfering with the rotary hose. The arrangement is especially applicable to drilling with portable masts. Since the links are vertical at all times, they are not suspended at an angle as with the conventional hook, but are part of a streamlined assembly which offers no interference with the mast structure.

The Type D-S connector is very compact, with an overall width of only 18¾ in. and an overall length of 72 in., and its 60-ton capacity makes it ideal for the rotary drilling of moderate depth wells. Construction details, photos and diagrams are shown in Bulletin 266, copy of which will be mailed upon request.

Marked Shim Stock

Thin shim stock supplied in slotted cartons by Laminated Shim Co., Inc., Glenbrook, Conn., now is furnished plainly marked in inches on its edge—from 0 to 100 in., with ½-in. subdivisions throughout the 100-in. length—at no extra price. Therefore the precision-thin metal can be conveniently pulled through the carton slot and cut off to the exact size required.

Not only is waste avoided but the markings also act as a tell-tale signal, indicating when the roll is about used up. These handy packaged rolls of brass or steel shim stock (6 in. wide and available in 0.001 to 0.015-in. thicknesses) facilitate shim-stock storage, prevent the stock from being mislaid and save time in use. Cut fingers are avoided and handling made easier by the slot-dispensing feature.

TRADE LITERATURE

WHITNEY CHAIN & MFG. CO., Hartford, Conn.—20-page booklet, No. V-150, covering Whitney roller chains and sprockets which are available as stock items at central distribution points. Information necessary for the selection of stock drives is given, and horsepower ratings, lengths and other data are covered.

M. B. SKINNER CO., South Bend, Ind.—Catalog No. 41, a 40-page manual on repair clamps, service fittings, drilling methods and equipment. Profusely illustrated, it contains much useful information, complete dimensions, installation instructions, and original data. New Skinner-Seal items not previously cataloged include nonshift service saddle, bull-neck street tee, forged welding tee, welding tube, and various drilling devices, cutters and adapters. A series of tables shows the 10 most widely used service methods, with data on equipment recommended for various sizes of tees, saddle outlets, pipe nipples and tubes. Covered in an attractive plastic binding, copies are available from the company by writing on business stationery.

HEWITT RUBBER CORP., Buffalo, N. Y.—Folder dealing with transmission belts, giving engineering data on correct type of belting. Tables show horsepower per inch of width, horsepower correction factors, arc of contact and belt speeds.

MICRO-WESTCO, INC., Bettendorf, Iowa.—Bulletins W.P. 301 and 330, covering the recently introduced Westco boiler-feed systems. The latter covers sizes to 25-hp. and 125-lb. pressure, while No. 301 covers systems for boiler sizes from 30 to 750 hp. and boiler pressures to 200 lb.

ALTEN'S FOUNDRY & MACHINE WORKS, Lancaster, Ohio—Bulletin P-105 dealing with its A-40-TC pumping unit, on which specifications are given. Charts, and instructions for their use, are given for determining the static polish-rod load, accelerator factor, polish-rod load, torque ratings, loss of stroke due to rod and tubing stretch, overtravel of plunger due to acceleration, production in barrels per hour and horsepower required.

Dale Consolidates Interests With Technical Oil Tool

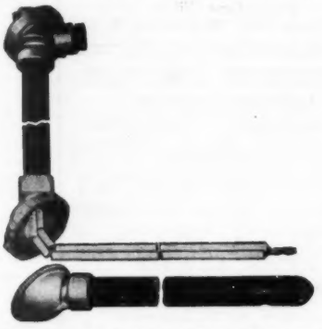
C. R. Dale, inventor and developer of many well-known instruments used in subsurface studies in oil fields, has consolidated his interest with those of Technical Oil Tool Corp., Ltd., Los Angeles, Calif., and will be actively engaged as a member of the technical staff in further invention and development work of a related nature, according to an announcement by J. B. Wood, president of the company.

C. R. DALE

Mr. Dale is well known for his development of oil-well surveying instruments, and the photoelectric oil-well water-locating instrument, now widely employed in domestic and foreign fields, and is a practical authority on subsurface investigations of oil wells. Announcement will be made shortly of a new subsurface recording system which Mr. Dale has had in development for a considerable time and which has seen wide field application, principally in the continuous measurement of well temperatures and pressures. This recorder will be developed, manufactured and marketed by the Technical Oil Tool Co.

Leeds & Northrup Adopt New Thermocouple Fitting

To facilitate thermocouple replacement, a universal union for angle-type couples has now been adopted by Leeds & Northrup Co., 4934 Stenton Avenue, Philadelphia, Pa. The two halves of this union fit snugly together in a ground joint making it vapor and fume-tight. By unscrewing a single clamping nut—which cannot fall off—the thermocouple's hot leg can be detached; or it can be rotated to any angle between 90° and 180°, and locked firmly in place.



Harold Brown Named Beaumont Representative for McEvoy

McEvoy Co., Houston, Tex., has announced the appointment of Harold L. Brown as sales representative for the Beaumont area. Mr. Brown is well qualified to serve equipment buyers because of his valuable experience as roughneck in Gulf Coast fields. He is now located at 2215 Avenue "A," Beaumont, Tex.

Maltby Company Moves to New Headquarters in Los Angeles

In line with the growing importance of southern California as an aviation, automotive, and oil-tool manufacturing center, Edward D. Maltby Co., specialists in ball, roller and needle bearings, has just removed its quarters to its own building at 1718 South Flower Street, Los Angeles. The new building is one of the most modern of its type in the United States, and includes general offices, private offices, store and stock rooms, sales office, display rooms, literature and loading rooms.

Edward D. Maltby Co. is backed by over 20 years of experience in the bearing field. The firm acts as factory representative for Marlin-Rockwell Corp. of Jamestown, N. Y., manufacturer of MRC ball bearings; Shafer Bearing Co. of Chicago; American Roller Bearing Co. of Pittsburgh, Pa.; Roller Bearing Co. of America, Trenton, N. J., and the Chicago Rawhide Manufacturing Co., Chicago. In addition, this company is a distributor of Timken tapered roller bearings to the automotive replacement trade.

The Maltby company maintains one of the most complete stocks of bearings on the Pacific Coast and every attention is given to the engineering phases of various industrial applications. Unbiased recommendations as to type are made possible by the many varied lines of merchandise carried. In other words, they will fit the right bearing to the right place, thereby making possible substantial savings.

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Financing

JOHN MORRIS, Box 5411, Philadelphia, studied records 5000 financial houses. Found only 191 buy new issues. $4.00.

WANTED—Oil loans $250,000 to $5,000,000. Low rates, long terms. L. A. (Pat) Casey. 511 Lexington Ave., New York; Esperson Bldg., Houston.

Ranches—Farm Lands

BARGAIN FOR CASH, cheap enough for safe investment. 640 acres hardwood timbered pasture land, good soil, make fine stock farm, fenced three sides hog-proof. Oil possibilities. Waskom Ranch, Naples, Texas.

129,000-A Ranch NW of Roswell, N. M., mtn. slope and prairie, fine grass and water, 11 springs, lakes, 20 mi. running streams, hiway, at $250,000. Howard Ingram, Perrine Bldg., Oklahoma City, Okla.

Money Raising

WANTED. Capital to develop shallow 100% leases in Southwest. Box A-230, The Oil and Gas Journal, Tulsa, Oklahoma.

Survey Service

REMEMBER EAST TEXAS
When all other methods fail, employ my divining or dowsing method. If oil exists this method finds it. Faults, broken treacherous areas accurately defined. Our Watson #2, first producer Wilmington, Calif., field, located by this method. More reliable than mechanical geophysics. Ask any unbiased oil authority. Many years' experience. A wise man investigates. George Miller, 1548 Post, Torrance, California.

CLASSIFIED ADVERTISING RATES

Classified advertising rates: First insertion, 35 cents a line; each additional insertion, 25 cents a line, PAYABLE IN ADVANCE. Six words usually make a line. Count as a word each one-letter word and each group of figures. White-space computed at regular line rate. Allow two extra lines for blind ads. Ads of less than three lines not accepted. No formal acknowledgment is made, and proofs cannot be shown in advance of publication.

	1 time	2 times	3 times	4 times		1 time	2 times	3 times	4 times
3 Lines	*$1.05*	*$1.80*	*$2.55*	*$3.30*	*7 Lines*	*$2.45*	*$4.20*	*$5.95*	*$7.70*
4 Lines	*1.40*	*2.40*	*3.40*	*4.40*	*8 Lines*	*2.80*	*4.80*	*6.80*	*8.80*
5 Lines	*1.75*	*3.00*	*4.25*	*5.50*	*9 Lines*	*3.15*	*5.40*	*7.65*	*9.90*
6 Lines	*2.10*	*3.60*	*5.10*	*6.60*	*10 Lines*	*3.50*	*6.00*	*8.50*	*11.00*

CLASSIFIED DISPLAY RATES

Classified Display is set with a border and may be used in one or two column sizes.

1 Inch ..... 1 time $5.00
1 Inch ..... 13 times ..... 4.50 per inch
1 Inch ..... 26 times ..... 4.00 per inch
1 Inch ..... 52 times ..... 3.50 per inch

This space may be contracted for over a period of one year from the date of the first insertion and is PAYABLE IN ADVANCE, MONTHLY.

We reserve the right to withhold all advertising of questionable character. To avoid delay be sure to send remittance with copy. We will set your ad in the smallest amount of space possible and refund all overpayments. One-time insertions will not be run until fully paid. Forms close MONDAY NOON before each issue date.

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

FOR SALE

One gasoline drilling rig with two 85 H.P. Waukesha motors and unitized draw works complete.

300 sets 3" A.P.I. tool joints.

10,000 Ft. 7" O.D. 26# seamless casing, once run.

15,000 Ft. 4½" O.D. seamless drill pipe equipped with both regular and full hole tool joints.

In addition to the above we have 20,000 Ft. screw line pipe in Oklahoma; also drilling rig capable of drilling to 6500 feet, complete stock of line pipe, casing, drilling and pumping equipment.

Wire, Write or Phone for Prices.

Louisiana Iron & Supply Co.
Shreveport, La.

NOTICE — CABLE-TOOL CONTRACTORS, Save money; good used wire lines. All sizes up to 5,000 ft. long. See us before you buy. General Tool & Supply Co., P.O. Box 4387, Oklahoma City, Oklahoma.

FOR SALE—USED BOILERS
3 90HP-225SWP Acme Oklahoma City
LUCEY PRODUCTS CORPORATION
TULSA

TWO WELL SERVICING UNITS, one 30 and one 60 model Caterpillar tractors with Cardwell and Hopper winches respectively, A-1 condition, priced reasonably with terms. Paul Rutledge, 424 N. Cincinnati, Tulsa, Okla.

TRANSIT and LEVEL REPAIRING
Fully equipped modern shop—all makes repaired
Low cost—service unsurpassed—all work guaranteed
Send for list of reconditioned instruments
We pay cash for used instruments
NATIONAL BLUE PRINT CO.
300 Union Station Bldg. Est. 1914 CHICAGO, ILL.
Chicago Sales Representatives—W. & L. E. Gurley

TRACTORS
Caterpillars, crawler type, size "35," $375; size "65" with nigger-head winch, $750; Caterpillar RD8 with bulldozer, $2000; Allis-Chalmers Model L with bulldozer $1750. Guaranteed, slightly used. O. C. Evans, Mt. Sterling, Ky.

LIQUIDATING BARNSDALL REFINERY—OKMULGEE, OKLAHOMA

Will Sell All or Any Part
Prices Quoted Where Located or f.o.b. Cars
—Send us your Inquiries—
New, Complete Inventory Will Be Available Immediately
Send Us Your Name and Address

SONKEN-GALAMBA SUPPLY COMPANY

W. C. Berry and H. J. Galamba
Riverview at Second, Kansas City, Kansas

Robt. W. Duden
2100 S. Union, Tulsa, Oklahoma

FOR SALE

ANY QUANTITY
NEW SEAMLESS STEEL COUPLINGS

400—5½" O.D., 8 round thread x 6¾" long, Casing at . . . 55c each
300—4", 8 thread x 4⅝" long, Line at . . . . . 55c each
1000—13" O.D. (12½" Pipe) 8-V thread, x 8¼" long, Line at $1.65 ea.

RECONDITIONED PIPE

30,000 feet 12", 50 lb. at $1.25 per foot
100,000 feet 6" Std. at .38 per foot
All of the above F.O.B. Philadelphia District, subject to prior sale. Pipe in lengths 18' 0" and longer, plain ends.

EASTERN PIPE SUPPLY COMPANY
1424 N. NINTH STREET,
PHILADELPHIA PENNA.

FOR SALE—Cheap, 4—4" x 1" x 6" anchor clamps. Indian Territory Illuminating Oil Co., Bartlesville, Okla.

OIL Well Supply Co. Imperial 2" make and break roller bearing rotary. Practically new. Drilling depth 6000'. P. O. Box 1602, New Orleans, La.

ONE 40 H.P. Type P.S. heavy duty Superior gas engine in A-1 shape. Has diesel attachments with straightway clutch, pump and lubricator. Wolfson Pipe & Supply Company, Wichita Falls, Texas.

FOR SALE—One gasoline rig with 2 Mack 165 H.P. dual-ignition motors, and 4000 ft. 4 inch drill pipe. All in excellent condition. KILGORE MACHINE SHOP, Kilgore, Texas.

ONE 7' x 12' two-door steel tool house. One 4-in-line roller bearing crown block with 36" manganese steel sheaves on 20" beams. A-1 shape. 1300 Ramsey Tower, Oklahoma City, Oklahoma.

FOR SALE—Askania Vertical Magnetometer rectangular type, complete and with 180 degree stop tripod. Good condition and ready to use. P.O. Box 348, Taylor, Texas.

25 K.W. and 40 K.W. Gas Engines, 220 volts, D.C. Two 100 K.W. Gas Engine-Generator Sets, 220 volts, D.C. 7x6 Ingersoll-Rand ER-1 Air Compressor. Six-inch Oster Pipe Threading Machine. Also large stock of lathes, pipe machines, milling machines, etc. Send for our list.

Terms to suit.

CINCINNATI MACHINERY & SUPPLY CO.
26 West 2nd St., Cincinnati, Ohio

FOR SALE

30-TON S/G LIMA GASOLINE, 0-4-0 SWG. LOCO. NEW 1931, GOOD COND. ROLLER BEARING. Immed. Delivery. SEND US YOUR INQUIRIES FOR ANY KIND OF LOCOMOTIVES.

IRON & STEEL PRODUCTS, INC.
13412 S. Brainard Ave.
Chicago, Ill.
"Anything containing IRON or STEEL"

FOR SALE

One casing pulling machine, 50 ft. mast made of 14 x 16 inch fir wood, equipped with lines and tools complete. Powered by Mack motor with extra heavy winch. Write Box 188, Okmulgee, Okla.

Equipment Wanted

WANTED

LEEDS & Northrup instruments, controlling pyrometers, all makes, obsolete and defective types considered. When appropriations are hard to get, use our offer for surplus and obsolete pyrometers to get new equipment. Box A-233, The Oil and Gas Journal, Tulsa, Oklahoma.

New York Markets

(Continued from Page 89)

The 15-cent advance in Pennsylvania Grade crude-oil prices last week stimulated some activity in the lubricating oils and both neutrals and bright stock were reported more active. Some observers laid the activity to a desire to beat an increase in prices that was expected to follow the crude-oil advance. However, there have been no indications of advances in either product though both have shown a better tone this week.

Because of the fact that runs of Pennsylvania Grade crude oil have been in excess of production for the past few weeks, close observers of the Pennsylvania market had anticipated last week's advance. Refusal of the Sinclair Refining Co. to match the increase in the Allegany field was regarded as evidence that production there is still more than adequate and no especial significance was attached to its action in maintaining existing prices.

The recommendation of the Defense Advisory Commission that residual-fuel-oil stocks on the East Coast be increased through imports apparently had little effect on the market though it introduced a new factor. One refiner expressed the belief that if larger supplies of residual fuel oil were needed here it would be better to import them than to produce them domestically for the latter would be necessarily accompanied by excessive production of gasoline.

Tank-Wagon Changes

(Continued from Page 90)

Burlington, Vt.; Boston and Worcester, Mass.; Hartford and New Haven, Conn., and Providence, R. I. On the same date, the company advanced the dealer price 0.3 cent per gallon at Portland, Me., and Boston, Mass.; raised 0.5 cent at Worcester, Mass., and 0.2 cent at Providence, R. I. Kerosene tank-wagon prices were reduced by Socony-Vacuum 0.3 cent per gallon at Manchester, N. H., and New Haven, Conn., November 8.

Mississippi and Southeast

(Continued from Page 85)

Prentiss County

Home Dev. Co. 1 Allen, SW NW SE 8-7s-9e, S.D. 2,165 ft. (cor.), H.F.W. with rainbow of oil at 2,145 ft.

Sharkey County

British American Oil Prod. Co. 1 F. B. Houston est., N½ NE SW 23-11n-7w, drilling 3,720 ft., Wilcox 1,575 ft., Midway 2,807 ft., Selma 3,280 ft., Paluxy 3,292 ft., show oil in porous chalk 3,283-84 ft.

Tishomingo County

Mellen & Gear 1 Wood, SE SE SE 21-4s-11e, S.D. 840 ft., Trenton 819 ft., show gas 807-19 ft.

Warren County

W. O. Allen 1 T. Henry, C W½ SW 4-7n-4w, drilling 7,277 ft., Wilcox 5,780 ft., Selma 6,676 ft., Eutaw 6,800 ft., porous sand 7,242-71, to abandon.
Barker & Brander 1 Parker, NW NW 17-14n-1e, curing titles.
Magnolia & Exchange 1 Paxton-Brown, NW NW 13-14n-4e, drilling 4,990 ft., Wilcox 3,488 ft.

Winston County

Fraim & Young 1 Chancellor, NE 9-13n 14e, spudded.

Yazoo County

Arcarea Reserve Co. 1 J. G. Holmes, SE SE 22-12n-1e, S.D. 5,616 ft., plan to deepen, Wilcox 1,530 ft., Midway 3,665 ft., Clayton 4,492 ft., Selma 4,566 ft., Eutaw 5,377 ft.
Joe Dawson 1 J. L. Wilson, SE SE SW 30-12n-3e, drilling 4,135 ft.

MISSISSIPPI FIRST REPORTS

Jackson—Hinds County

Stanford & Sellers 1 Sellers, 23-6n-1e.

Tinsley—Yazoo County

Union 6 Perry, SE NW 24-10-3.

ALABAMA WILDCATS

Fayette County

B. L. Fillingame 1 T. Harbin, NW SW 3-16s-12w, S.D. 1,240 ft.

Franklin County

E. O. Heath, Jr. 1 W. O. Hester, SW SW 4-6s-12w, drilling 310 ft.

Madison County

J. L. Caldwell et al 1 Joe McCord, NW SE SE 30-1s-2e, S.D. 105 ft.

Walker County

Champlin Oil & Ref. Co. 1 Galloway Coal Co., 12-13s-10w, Tuscumbia 2,169 ft., drilling lime 3,630 ft.

GEORGIA WILDCATS

Treutlen County

Rose & Ray 1 James Fowler, 6 mi. NE Soperton, T.D. 2,135 ft., reported show of oil, S.D., titles, arranging to set casing.

CRUDE-OIL PRICES IN REPRESENTATIVE FIELDS

Complete crude-price schedules are now being published in the first issue of each month. The last complete schedule was published in the October 3 issue. All changes in crude-oil-price schedules will be published completely in the first issues following the announcement of the changes. Following are representative crude-price schedules in barrels (42 gal.):

East Texas	$1.10
Conroe	1.27
Tepetate, Louisiana	1.03
Smackover, Arkansas, heavy	.73
Illinois basin	1.15
Pecos County, Texas	.78
Lance Creek, Wyoming	.77
Bradford, Pennsylvania	1.85

Gravity Schedules

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

	Hill, California* Signal	Oklahoma, Kansas	Coast, Texas Gulf
14-14.9	$0.65	....	....
15-15.9	.65	....	....
16-16.9	.65	....	....
17-17.9	.65	....	....
18-18.9	.65	....	....
19-19.9	.69	....	$0.86
20-20.9	.73	$0.70	.88
21-21.9	.78	.72	.90
22-22.9	.82	.74	.92
23-23.9	.86	.76	.94
24-24.9	.90	.78	.96
25-25.9	.95	.80	.98
26-26.9	.99	.82	1.00
27-27.9	1.03	.84	1.02
28-28.9	1.07	.86	1.04
29-29.9	1.10	.88	1.06
30-30.9	1.14	.90	1.08
31-31.9	....	.92	1.10
32-32.9	....	.94	1.12
33-33.9	....	.96	1.14
34-34.9	....	.98	1.16
35-35.9	....	1.00	1.18
36-36.9	....	1.02	1.20
37-37.9	....	1.04	1.22
38-38.9	....	1.06	1.24
39-39.9	....	1.08	1.26
40-40.9	....	1.10	1.28

*Effective Feb. 1, 1940.

Crude-Oil Price Changes

The Pure Oil Co. advanced Cabin Creek crude oils 15 cents per barrel November 12 meeting the Pennsylvania Grade advance instituted by South Penn Oil Co. Quaker State Oil Refining Corp. increased Eureka and Buckeye prices 15 cents November 12, making Buckeye, $1.55 and Eureka, $1.59 per barrel.

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